1768 CompactLogix Selection Guide

1768-L43

Rockwell Automation

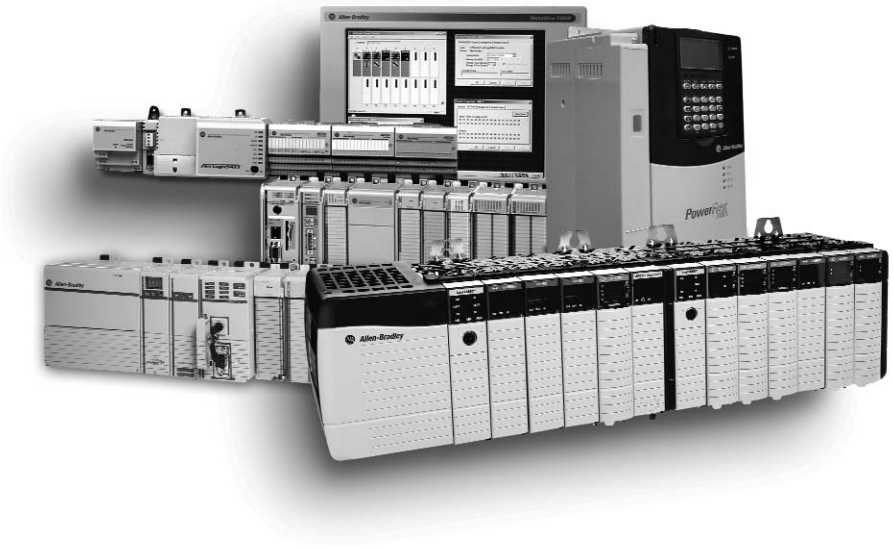
Logix Controllers Comparison

Common Characteristics	1756 ControlLogix	1768 CompactLogix	1769 CompactLogix	1789 SoftLogix5800	1794 FlexLogix	PowerFlex 700S with DriveLogix
Controller tasks: • Continuous • Periodic • Event	• 32 tasks (only 1 continuous) • event tasks: supports all event triggers	• 16 tasks (only 1 continuous) • event tasks: supports consumed tag trigger, EVENT instruction, axis, and motion event triggers	• 1769-L35x: 8 tasks • 1769-L32x: 6 tasks • 1769-L31: 4 tasks • only 1 continuous • event tasks: supports consumed tag trigger and EVENT instruction	• 32 tasks (only 1 continuous) • event tasks: supports all event triggers, plus outbound and Windows events	• 8 tasks (only 1 continuous) • event tasks: supports consumed tag trigger and EVENT instruction	• 8 tasks (only 1 continuous) • event tasks: supports axis and motion event triggers
User memory	1756-L55M12: 750 KB 1756-L55M13: 1.5 MB 1756-L55M14: 3.5 MB 1756-L55M16: 7.5 MB 1756-L55M22: 750 KB 1756-L55M23: 1. 5 MB 1756-L55M24: 3.5 MB 1756-L61: 2 MB 1756-L62: 4 MB 1756-L63: 8 MB	1768-L43: 2 MB	1769-L31: 512 KB 1769-L32x: 750 KB 1769-L35x: 1.5 MB	1789-L10: 2 MB 3 slots no motion 1789-L30: 64 MB 5 slots 1789-L60: 64 MB 16 slots	1794-L34: 512 KB	256 KB 768 KB with memory expansion
Nonvolatile user memory	1756-L55M12: none 1756-L55M13: none 1756-L55M14: none 1756-L55M16: none 1756-L55M22: yes 1756-L55M23: yes 1756-L55M24: yes 1756-L6x: CompactFlash	CompactFlash	CompactFlash	none	yes	yes (expansion memory)
Built-in communication ports	1 port RS- 232 serial (DF1 or ASCII)	1 port RS- 232 serial (DF1 or ASCII)	• 1769-L31 has 2 RS-232 ports (one DF1 only, other DF1 or ASCII) • 1769-L32C, -L35CR has 1 ControlNet port and 1 RS-232 serial port (DF1 or ASCII) • 1769-L32E, -L35E has 1 EtherNet/IP port and 1 RS-232 serial port (DF1 or ASCII)	depends on personal computer	• 1 port RS-232 serial (DF1 or ASCII) • 2 slots for 1788 communication cards	• 1 port RS-232 serial (DF1 or ASCII) • 1 slot for 1788 communication cards
Communication options (these options have specific products and profiles for their platform - other options are available via third party products and generic profiles)	EtherNet/IP ControlNet DeviceNet Data Highway Plus Universal Remote I/ O serial Modbus via ladder routine DH-485 SynchLink	EtherNet/IP DeviceNet serial Modbus via ladder routine DH-485	EtherNet/IP ControlNet DeviceNet serial Modbus via ladder routine DH-485	EtherNet/IP ControlNet DeviceNet serial	EtherNet/IP ControlNet DeviceNet serial Modbus via ladder routine DH-485	EtherNet/IP ControlNet DeviceNet serial Modbus via ladder routine DH-485
Connections	64 over ControlNet (48 recommended) 128 over EtherNet/IP 64 TCP/IP	128 over EtherNet/IP 64 TCP/IP	32 over ControlNet 32 over EtherNet/IP 64 TCP/IP	64 over ControlNet (48 recommended) EtherNet/IP limited by type and number of cards	32 over ControlNet 32 over EtherNet/IP 64 TCP/IP	32 over ControlNet 32 over EtherNet/IP 64 TCP/IP
Controller redundancy	full redundancy support	not applicable	not applicable	not applicable	controller hot backup via DeviceNet	not applicable
Native I/O	1756 ControlLogix I/O	1769 Compact I/O	1769 Compact I/O	none	1794 FLEX I/O 1797 FLEX Ex I/O	1794 FLEX I/O 1797 FLEX Ex I/O
Simple motion	stepper servo via DeviceNet analog ac drive	stepper servo via DeviceNet analog ac drive	stepper servo via DeviceNet analog ac drive	stepper servo via DeviceNet analog ac drive	stepper servo via DeviceNet analog ac drive	stepper servo via DeviceNet analog ac drive
Integrated motion	SERCOS interface analog interface with options: • quadrature encoder input • LDT input • SSI input	SERCOS interface	not applicable	SERCOS interface analog interface with options: • quadrature encoder input • LDT input • SSI input	not applicable	1 full servo 1 feedback axis
Mounting and/or installation options	1756 chassis	panel mount DIN rail	panel mount DIN rail	none	panel mount DIN rail	embedded
Programming languages	• relay ladder • structured text • function block • sequential function chart	• relay ladder • structured text • function block • sequential function chart	• relay ladder • structured text • function block • sequential function chart	• relay ladder • structured text • function block • sequential function chart • external routines (Windows DLLs developed using C/C++)	• relay ladder • structured text • function block • sequential function chart	• relay ladder • structured text • function block • sequential function chart

Logix Platforms

Allen-Bradley Logix platforms provide a single integrated control architecture for sequential, drives, motion, and process control.

The Logix platforms provide a common control engine, programming software environment, and communication support across multiple hardware platforms. All Logix controllers operate with a multitasking, multiprocessing operating system and support the same set of instructions in multiple programming languages. One RSLogix 5000 programming software package programs all Logix controllers. And, as part of the Integrated Architecture, all Logix controllers offer the benefits of the Common Industrial Protocol (CIP) to communicate via EtherNet/IP, ControlNet, and DeviceNet networks.



Contents

1768 CompactLogix System

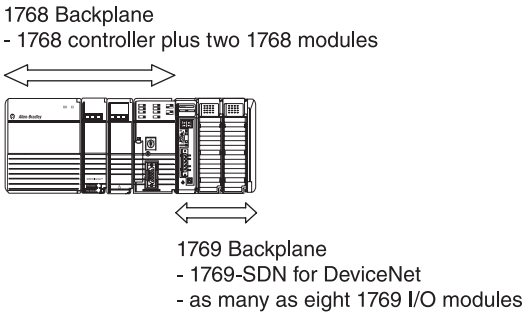
What's New in Version 15:

- *1768-L43 controller*
- *1768-ENBT EtherNet/IP communication module*
- *1768-M04SE motion interface module*
- *1768-PA3 power supply*

CompactLogix is designed to provide a Logix solution for medium applications. Typically, these applications are machine-level control applications with motion axes, I/O requirements, and network connectivity requirements.

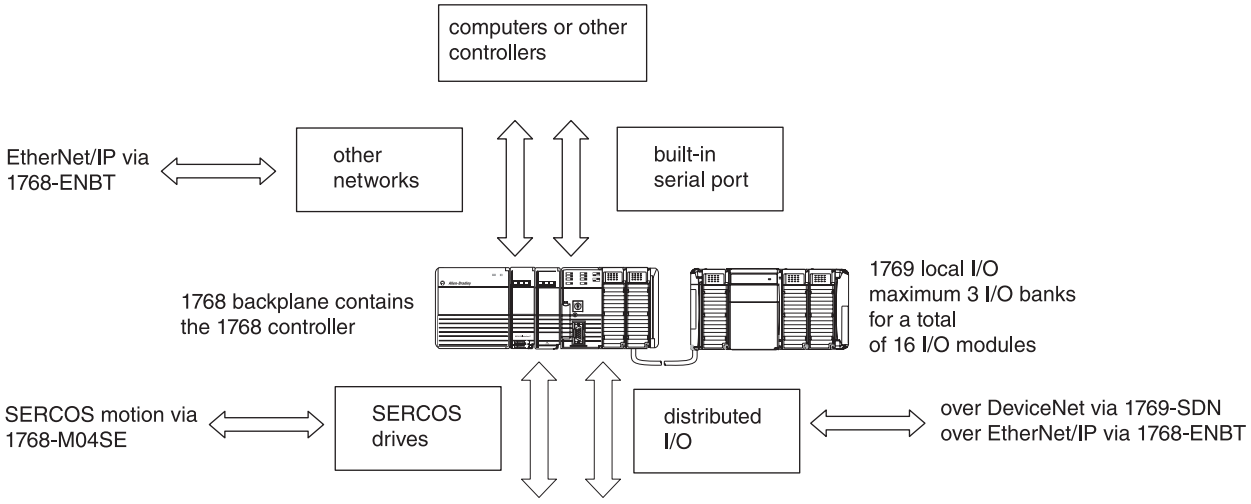
The 1768-L43 controller offers one built-in serial port. Install an optional 1768-ENBT communication module for EtherNet/IP communications. Install a 1768-M04SE SERCOS adapter module for motion control of SERCOS drives.

A simple system can consist of a stand-alone controller with a single bank of I/O modules and DeviceNet communication.



In a more complex system, add other networks and motion control. Multiple controllers can communicate across networks and share data.

- Multiple controllers joined across networks
- I/O in multiple platforms that is distributed in many locations and connected in as many three different banks of I/O modules



The 1768 CompactLogix controller combines both a 1768 backplane and a 1769 backplane. This provides the advantages of the 1768 architecture while retaining the advantages of 1769 I/O support.

In the 1768 backplane:

- 1768 power supply is the leftmost module
- 1768 controller is the rightmost module
- Two additional 1768 modules can be placed between the power supply and controller:
  - 1768-ENBT for EtherNet/IP communication (maximum of two)
  - 1768-M04SE for SERCOS motion control (maximum of one)
- As many as eight local 1769 I/O modules (including a 1769-SDN) can be installed to the right of the 1768 controller

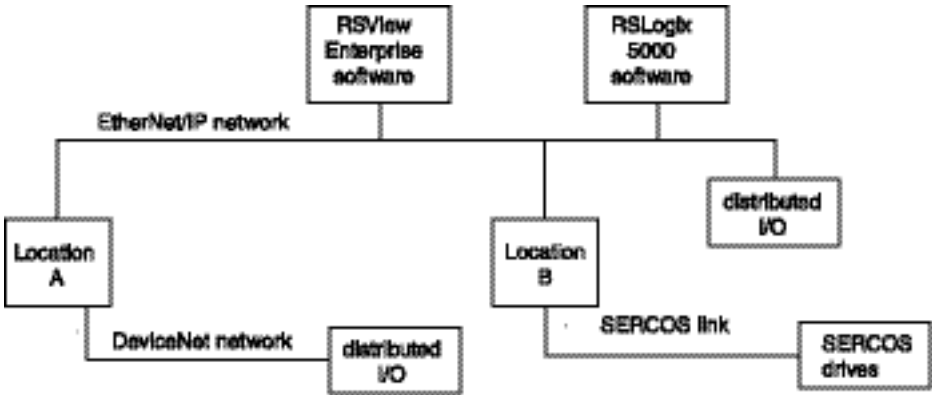
The controller supports a maximum of 16 local 1769 I/O modules. As many as eight of the local modules can be attached to the 1768 controller. Install the remaining modules in one or two additional I/O banks. The additional banks are powered by standard 1769 power supplies (that is, 1769-PA4) and connected to the main rack using standard 1769 extension cables (that is, 1769-CRLx).

Layout the System

As you layout a system configuration, determine the network configuration and the placement of components in each location. Decide at this time whether each location will have its own controller.

Use the 1768 CompactLogix system to distribute control among different locations. You can remotely control I/O and field devices from a central controller over an EtherNet/IP network.

For example, this system layout defines Location A and Location B, which each require a unique 1768 CompactLogix controller. Location A and Location B each have their own local I/O modules. Location A also has some distributed DeviceNet I/O devices, so that location also needs a 1769-SDN DeviceNet scanner. Location B has SERCOS drives, so that location needs a 1768-M04SE adapter. A supervisory EtherNet/IP network interlocks Location A and Location B.



Specify a System

Follow these steps as you specify your CompactLogix system:

✓	Step	See	
	1 Select I/O devices		
	Use a system spreadsheet to record: • Location of the device • Number of points needed • Appropriate catalog number • Number of points available per module • Number of modules	I/O module specifications Wiring systems Place I/O modules How I/O modules operate	page 5 page 12 page 13 page 14
	2 Select motion control and drives requirements To the system spreadsheet, add the number of motion modules.	Motion overview SERCOS interface modules	page 15 page 16
	3 Select communication modules To the system spreadsheet, add the number of communication modules.	Network overview EtherNet/IP specifications DeviceNet specifications Serial specifications DH-485 specifications	page 22 page 23 page 25 page 27 page 28
	4 Select controllers Select the appropriate controller based on: • Required controller tasks • Number of I/O points needed • Number of communication cards needed • Required controller memory	Controller specifications Determine memory requirements Control devices Communicate with other devices Logix system tasks PhaseManager applications Logix system connections	page 29 page 30 page 32 page 33 page 34 page 34 page 35
	5 Select power supplies On the module spreadsheet, calculate power requirements.	1768 power supply specifications 1769 power supply specifications	page 40 page 41
	6 Mount the system Determine whether to panel mount or DIN-rail mount the CompactLogix system.	Mounting requirements	page 43
	7 Select ViewAnyWare products Determine the ViewAnyWare products that fit your operator interface needs.	RSView software PanelView Plus terminals VersaView industrial computers VersaView CE industrial computers	page 45 page 46 page 46 page 46
	8 Select software Determine the software products you need to configure and program your application.	Available software products Programming software Communication software Network configuration software Emulation software	page 47 page 48 page 50 page 52 page 54

Step 1 - Select:

- *I/O modules*
- *1492 wiring system (if you want to use a wiring system instead of the terminal block that comes with module)*
- *PanelConnect modules and cables if connecting input modules to sensors*
- *1769-CRLx expansion cables for multiple banks of I/O modules*

1769 Compact I/O Modules

The 1769 Compact I/O modules can be used as local I/O for a CompactLogix controller. Install the I/O modules on a panel with two mounting screws or on a DIN rail. The modules mechanically lock together by means of a tongue-and-grove design and have an integrated communication bus that is connected from module to module by a moveable bus connector.

Each I/O module includes a built-in removable terminal block with finger-safe cover for connections to I/O sensors and actuators. The terminal block is behind a door at the front of the module. I/O wiring can be routed from beneath the module to the I/O terminals.

Local I/O Performance

The 1768 CompactLogix controller supports as many as 16 local 1769 I/O modules (maximum of 32 points per digital module and 8 points per analog module). As many as eight of the local modules can be attached to the 1768 backplane. The remaining eight modules can be in one or two additional I/O banks. The additional banks are powered by standard 1769 power supplies (that is, 1769-PA4) and connect to the main rack using standard 1769 extension cables (that is, 1769-CRLx).

For the best local I/O performance in a 1768 CompactLogix system:

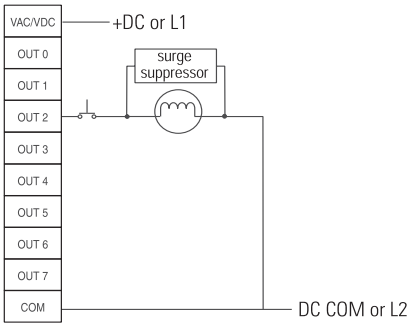
- configure an individual RPI for each local 1769 I/O module.
- you can select individual RPIs as fast as 1 millisecond.
- use faster RPIs for time critical I/O without impacting overall 1769 I/O performance.
- use Immediate Output (IOT) instructions for further reduction in I/O update times.

I/O update times do not affect overall 1768 bus performance, such as motion performance or controller performance.

Each 1769 I/O module has a distance rating. In 1769 systems, the distance rating is the number of modules between the specific module and the 1769 power supply. In a 1768 system, the distance rating is the number of modules between the specific I/O module and the 1768 controller.

Digital I/O Modules

Type of Module	Description
Input module	An input module responds to an input signal in the following manner: • Input filtering limits the effect of voltage transients caused by contact bounce and/or electrical noise. If not filtered, voltage transients could produce false data. All input modules use input filtering. • Optical isolation shields logic circuits from possible damage due to electrical transients. • Logic circuits process the signal. • An input LED turns on or off indicating the status of the corresponding input device.
Output module	An output module controls the output signal in the following manner: • Logic circuits determine the output status. • An output LED indicates the status of the output signal. • Optical isolation separates module logic and bus circuits from field power. • The output driver turns the corresponding output on or off.



Most output modules have built-in surge suppression to reduce the effects of high-voltage transients. Use an additional suppression device if an output is being used to control inductive devices, such as relays, motor starters, solenoids, or motors. Additional suppression is especially important if your inductive device is in series with or parallel to hard contacts, such as push buttons or selector switches.

Add a suppression device directly across the coil of an inductive device to reduce the effects of voltage transients caused by interrupting the current to that device and to prolong the life of the switch contacts.

When planning I/O communications, consider:

- which Compact I/O modules to use.
- where to place Compact I/O modules.
- how Compact I/O modules operate.

1769 Compact Digital AC Input Modules

Cat. No.	Number of Inputs	Voltage Category/Type, Input	Voltage Range	Input Delay Time, ON to OFF	Current, On-State Input, Min.	Current, Off-State Input, Max.	Backplane Current (mA) at 5V	Power Supply Distance Rating
1769-IA8I	8 individually isolated	100 or 120V ac	79...132V ac @ 47...63Hz	20 ms	5 mA @ 79V ac	2.5 mA	90 mA	8 modules
1769-IA16	16	100 or 120V ac	79...132V ac @ 47-63Hz	20 ms	5 mA @ 79V ac	2.5 mA	115 mA	8 modules
1769-IM12	12	200 or 240V ac	159...265V ac @ 47-60Hz	20 ms	5 mA @ 159V ac	2.5 mA	100 mA	8 modules

1769 Compact Digital AC Output Modules

Cat. No.	Number of Outputs	Voltage Category/Type, Output	Voltage Range	Leakage Current, Off-State Output, Max	Current per Output, Max.	Current per Module, Max.	Backplane Current (mA) at 5V	Power Supply Distance Rating
1769-OA8	8	100…240V AC	85...265 ac @ 47...63Hz	2.0 mA at 132V ac 2.5 mA at 265V ac	0.25 A @ 60 °C (140 °F) 0.50 A @ 30 °C (86 °F)	2.0 A @ 60 °C (140 °F) 4.0 A @ 30 °C (86 °F)	145 mA	8 modules
1769-OA16	16	100…240V AC	85...265 ac @ 47...63Hz	2.0 mA at 132V ac 2.5 mA at 265V ac	0.25 A @ 60 °C (140 °F) 0.50 A @ 30 °C (86 °F)	4.0 A @ 60 °C (140 °F) 8.0 A @ 30 °C (86 °F)	225 mA	8 modules

Recommended Loading Resistor - To limit the effects of leakage current through solid state outputs, a loading resistor can be connected in parallel with your load. For 120V ac operation, use a 15 kΩ, 2W resistor. For 240V ac operation use a 15 kΩ, 5W resistor.

1769 Compact Digital DC Input Modules

Cat. No.	Number of Inputs	Voltage Category/Type, Input	Voltage Range	Input Delay Time, ON to OFF	Current, On-State Input, Min.	Current, Off-State Input, Max.	Backplane Current (mA) at 5V	Power Supply Distance Rating
1769-IQ6XOW4	6	24V dc, sinking or sourcing	10...30V dc @ 30 °C (86 °F) 10...26.4V dc @ 60 °C (140 °F)	8 ms	2 mA	1.5 mA	105 mA	8 modules
1769-IQ16	16	24V DC, sinking or sourcing	10...30V dc @ 30 °C (86 °F) 10...26.4V dc @ 60 °C (140 °F)	8 ms	2 mA	1.5 mA	115 mA	8 modules
1769-IQ16F	16 high-speed	24V dc, sinking or sourcing	10...30V dc @ 30 °C (86 °F) 10...26.4V dc @ 60 °C (140 °F)	1 ms	2 mA	1.5 mA	110 mA	8 modules
1769-IQ32	32	24V dc, sinking or sourcing	10...30V dc @ 30 °C (86 °F) 10...26.4V dc @ 60 °C (140 °F)	8 ms	2 mA	1.5 mA	170 mA	8 modules
1769-IQ32T	32 terminated	24V dc, sinking or sourcing	20.4...26.4V dc	8 ms	3 mA	1.7 mA	170 mA	8 modules

1769 Compact Digital DC Output Modules

Cat. No.	Number of Outputs	Voltage Category/Type, Output	Voltage Range	Leakage Current, Off-State Output, Max	Current per Output, Max.	Current per Module, Max.	Backplane Current (mA) at 5V	Power Supply Distance Rating
1769-OB8	8	24V dc, sourcing	20.4...26.4 dc	1.0 mA @ 26.4V ac	2.0 A @ 60 °C (140 °F)	8.0 A @ 60 °C (140 °F)	145 mA	8 modules
1769-OB16	16	24V dc, sourcing	20.4...26.4 dc	1.0 mA @ 26.4V ac	0.5 A @ 60 °C (140 °F) 1.0 A @ 30 °C (86 °F)	4.0 A @ 60 °C (140 °F) 8.0 A @ 30 °C (86 °F)	200 mA	8 modules
1769-OB16P	16 protected	24V dc, sourcing	20.4...26.4 dc	1.0 mA @ 26.4V ac	0.5 A @ 60 °C (140 °F) 1.0 A @ 30 °C (86 °F)	4.0 A @ 60 °C (140 °F) 8.0 A @ 30 °C (86 °F)	160 mA	8 modules
1769-OB32	32	24V dc, sourcing	20.4...26.4 dc	1.0 mA @ 26.4V ac	0.5 A @ 60 °C (140 °F) 1.0 A @ 30 °C (86 °F)	8.0 A @ 60 °C (140 °F) 16.0 A @ 30 °C (86 °F)	300 mA	8 modules
1769-OV16	16	24V DC, sinking	20.4...26.4 dc	1.0 mA @ 26.4V ac	0.5 A @ 60 °C (140 °F) 1.0 A @ 30 °C (86 °F)	4.0 A @ 60 °C (140 °F) 8.0 A @ 30 °C (86 °F)	200 mA	8 modules
1769-OV32T	32 terminated	24V dc, sinking	10.2...26.4 dc	1.0 mA @ 26.4V ac	0.5 A @ 60 °C (140 °F) 1.0 A @ 30 °C (86 °F)	4.0 A @ 60 °C (140 °F) 8.0 A @ 30 °C (86 °F)	220 mA	8 modules

1769 Compact Digital Contact Output Modules

Cat. No.	Number of Outputs	Voltage Category/Type, Output	Voltage Range	Leakage Current, Off-State Output, Max	Current per Output, Max.	Current per Module, Max.	Backplane Current (mA) at 5V	Backplane Current (mA) at 24V	Power Supply Distance Rating
1769-IQ6XOW4	4	24V dc	5...265V ac 5...125V dc	0 mA	2.5 A	8.0 A	105 mA	50 mA	8 modules
1769-OW8	8	24V dc	5...265V ac 5...125V dc	0 mA	0.5 A @ 60 °C (140 °F) 1.0 A @ 30 °C (86 °F)	16 A	125 mA	100 mA	8 modules
1769-OW8I	8 individually isolated	24V dc	5...265V ac 5...125V dc	0 mA	0.5 A @ 60 °C (140 °F) 1.0 A @ 30 °C (86 °F)	16 A	125 mA	100 mA	8 modules
1769-OW16	16	24V dc	5...265V ac 5...125V dc	0 mA	2.5 A	20 A	205 mA	180 mA	8 modules

Relay Contact Ratings

These ratings apply to the digital contact output modules.

Volts, Max.	Continuous Amps per Point	Amperes		Voltamperes		IEC 947	NEMA ICS 2-125
		Make	Break	Make	Break		
240V ac	2.5A	7.5A	0.75A	1800VA	180VA	AC15	C300
120V ac		15A	1.5A				
125V dc	1.0A	0.22A		28VA		DC13	R150
24V dc	2.0A	1.2A		28VA		—	—

Does not apply to the 1769-OW16 module.

Analog I/O Modules

Choose analog, thermocouple, or RTD modules.

- Individually configurable channels
- On-board scaling
- Autocalibration of inputs
- Selectable input filters
- Over-range and under-range detection and indication
- Input modules offer both single-ended or differential inputs
- High accuracy rating

1769 Compact Analog Modules

Cat. No.	Number of Inputs	Number of Outputs	Resolution, Bits	Signal Range	Sensors Supported	Backplane Current (mA) at 5V	Backplane Current (mA) at 24V	Power Supply Distance Rating
1769-IF4	4	—	14 bits (unipolar)	0…20 mA 4…20 mA 0…10V dc ±10V dc 0…5V dc 1…5V dc	—	105 mA	60 mA	8 modules
1769-IF4I	4 individually isolated	—	16 bits (unipolar)	±10.5V dc -0.5…10.5V dc -0.5...5.25V dc 0.5…5.25V dc	—	145 mA	95 mA	8 modules
1769-IF8	8	—	16 bits (unipolar)	0…20 mA 4…20 mA 0…10V dc ±10V dc 0…5V dc 1…5V dc	—	120 mA	70 mA	8 modules
1769-OF2	—	2	14 bits	—	—	120 mA	120 mA	8 modules
1769-OF4CI	—	4 current, individually isolated	16 bits (unipolar)	4…20 mA 0…20V mA	—	145 mA	140 mA	8 modules
1769-OF4VI	—	4 voltage, individually isolated	16 bits (unipolar)	-10…10V dc 0…5V dc 0...10V dc 1…5V dc	—	145 mA	75 mA	8 modules
1769-OF8C	—	8 current	16 bits (unipolar)	0…20 mA 4…20 mA	—	145 mA	160 mA	8 modules
1769-OF8V	—	8 voltage	16 bits (unipolar)	±10.5V dc -0.5…10.5V dc -0.5...5.25V dc 0.5…5.25V dc	—	145 mA	125 mA	8 modules
1769-IF4XOF2	4	2 individually isolated	8 bits plus sign❄ individually isolated	0…10V dc ±10V dc 0…5V dc 1…5V dc	—	120 mA	160 mA	8 modules
1769-IR6	6	—	Input filter and configuration dependent	—	100, 200, 500, 1000 Ω Platinum, alpha=385 100, 200, 500, 1000 Ω Platinum, alpha=3916 120 Ω Nickel, alpha=672 120 Ω Nickel, alpha=618 10 Ω Copper 604 Ω Nickel-Iron 518 0…150 Ω 0…500 Ω 0…1000 Ω 0…3000 Ω	100 mA	45 mA	8 modules
1769-IT6	6, plus 2 cold junction sensors	—	—	—	Thermocouple types: J, K, T, E, R, S, B, N, C ±50mV ±100mV	100 mA	40 mA	8 modules

If the optional 24V dc Class 2 power supply is used, the 24V dc current draw from the bus is 0 mA.
❄Sign is always positive.

Specialty I/O Modules

Specialty I/O modules are available for more application-specific needs.

1769-HSC High-speed Counter Module

Use the 1769-HSC when you need:
- a counter module that is capable of reacting to high-speed input signals
- to generate rate and time-between-pulses (pulse interval) data
- as many as 2 channels of quadrature or 4 channels of pulse/count inputs

Cat. No.	Number of Inputs	Number of Outputs	Backplane Current (mA) at 5V	External Power	Power Supply Distance Rating
1769-HSC	2	4	425 mA	19.2...31.2V dc 100 mA @ 24V dc	4 modules

1769-ARM Address Reserve Module

Use a 1769-ARM address reserve module to reserve module slots. After creating an I/O configuration and user program, you can remove and replace any I/O module in the system with a 1769-ARM module once you inhibit the removed module in RSLogix 5000 programming software.

Cat. No.	Number of Inputs	Number of Outputs	Backplane Current (mA) at 5V	Power Supply Distance Rating
1769-ARM	—	—	60 mA	8 modules

Compact I/O to PowerFlex Drives

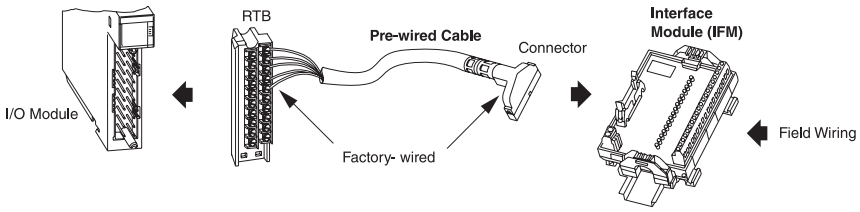
The 1769-SMx modules provide direct 1769 platform connection to PowerFlex drives.

Cat. No.	Description	Communication Rate	Backplane Current (mA) at 5V	Backplane Current (mA) at 24V	Power Supply Distance Rating
1769-SM1	Compact I/O to DPI/SCANport Module connects to PowerFlex 7-class drives, other DPI-based host devices, and SCANport-based host devices such as 1305 and 1336 PLUS II drives	DPI: 1925 Kbps or 250 Kbps SCANport: 125 Kbps	280 mA	60 mA per channel supplied by the DPI/SCANport host	6 modules
1769-SM2	Compact I/O to DSI/Modbus Module connects to PowerFlex 4-class drives and to other Modbus RTU slave devices, such as PowerFlex 7-class drives with 20-COMM-H RS485 HVAC adapters	DSI: 19.2 Kbps Modbus RTU: 300...38.4 Kbps	350 mA	0 mA	4 modules

1492 Wiring Systems

As an alternative to buying RTBs and connecting the wires yourself, you can buy a wiring system of:

- interface modules (IFMs) that provide the output terminal blocks for digital I/O modules. Use the pre-wired cables that match the I/O module to the IFM.
- analog interface modules (AIFMs) that provide the output terminal blocks for analog I/O modules. Use the pre-wired cables that match the I/O module to the AIFM.
- I/O-module-ready cables. One end of the cable assembly is an RTB that plugs into the front of the I/O module. The other end has individually color-coded conductors that connect to a standard terminal block.



1667 PanelConnect Modules for Connecting Sensors

A PanelConnect module and its sensor connection system connect sensors directly to I/O modules using convenient pre-built cables and connectors.

The PanelConnect module mounts on the enclosure and creates the correct seal for the entry of the sensor connections. You do not need to seal the opening where the sensor cables enter the enclosure, create custom connectors, or wire to those custom connectors.

Place Compact I/O Modules in a CompactLogix System

You can DIN-rail or panel mount the controller and I/O modules. The number of local I/O modules supported depends on the controller.

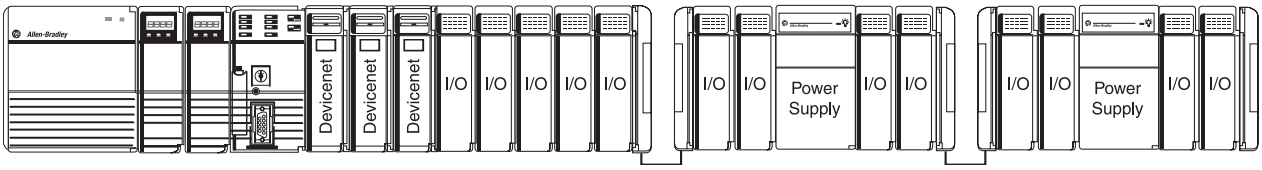
This Controller	Supports	That Can Be In
1768-L43	16 local modules	3 separate banks

Each 1769 I/O module has a distance rating. In 1769 systems, the distance rating is the number of modules between the specific module and the 1769 power supply. In a 1768 system, the distance rating is the number of modules between the specific I/O module and the 1768 controller.

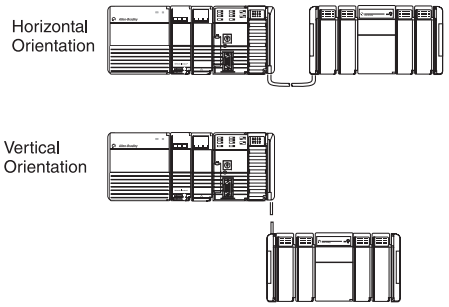
Select Expansion Cables

The 1768 power supply supports as many as eight 1769 modules. If you have more 1769 modules, install them in one or two additional I/O banks. If you divide 1769 modules into multiple banks:

- each bank can only contain 1769 I/O modules.
- each bank needs its own, standard 1769 power supply, such as 1769-PA4.
- use expansion cables to connect the banks.
- the last I/O bank requires an end cap.



How you orient I/O banks determines which expansion cables you need to connect the I/O banks.



If You Add a:	And Connect the Chassis:	Use This Cable:
Second bank	right to left	1769-CRLx
	right to right	1769-CRRx
Third bank	right to left	1769-CRLx
	right to right	1769CRRx
	left to left	1769-CLLx

Where x = 1 for 1 ft (305 mm) or 3 for 3.28 ft (1 m).

Select End Caps

The final I/O bank in the CompactLogix system needs an end cap on the end without the expansion cable.

For a	Order
Right end cap	1769-ECR
Left end cap	1769-ECL

Plan Local and Remote (Distributed) I/O

In addition to local I/O, the CompactLogix controller can control remote (distributed) I/O via the:

- EtherNet/IP network using a 1768-ENBT communication module.
- DeviceNet network using a 1769-SDN scanner module.

While local I/O can be lower in cost and easier to configure, configuring distributed I/O offers:

- More versatility in laying out your system
- More communication options, such as DeviceNet, ControlNet, and EtherNet/IP networks
- Ability to configure the listen-only communication format for remote I/O modules

How Compact I/O Modules Operate

The 1769 backplane is a master/slave backplane. All 1769 I/O modules in a CompactLogix system are scanned asynchronous to the program scan at a configurable Requested Packet Interval (RPI) rate. You configure an individual RPI for each local 1769 I/O module.

The controller continually scans the control logic. One scan is the time it takes the controller to execute the logic once. Input data transfers to the controller and output data transfers to output modules asynchronous to the logic scan.

Important: The CompactLogix 1769 and 1768 backplanes do not support Removal and Insertion Under power (RIUP). While the CompactLogix system is under power, any break in the connection between the 1768 power supply and the controller (such as removing the power supply, controller, or 1768 module) clears controller memory (including the user program). Any break between the 1768-L43 controller and 1769 I/O does not clear memory but causes a major fault in the controller.

Step 2 - Select:

- *Size the motion application (use the Motion Analyzer)*
- *How you want to interface the controller and drives*
- *A SERCOS interface module*
- *Associated cables*
- *Select drives, motors, and accessories (use the Motion Analyzer)*

Motion Control Requirements

The Logix approach to motion control employs synchronized, distributed processing and provides a highly-integrated motion solution. Logix integrates sequential and motion control to bring unmatched flexibility to machine design and unprecedented efficiency to the manufacturing floor. RSLogix 5000 Enterprise series software supports a comprehensive set of embedded motion instructions that can be programmed using the relay ladder, structured text, or sequential function chart editors.

The Logix architecture supports motion components that work in a wide variety of machine architectures.

- The Kinetix integrated motion solution uses a SERCOS interface module to perform complex, multi-axis, synchronized motion. With a Kinetix system, you reap the full benefit of the integrated architecture because the integration doesn't stop at the controller. This system integrates the drive, the motor, and even the actuator at a lower cost per axis of motion.
- Networked motion provides the ability to connect via the DeviceNet network to a single-axis drive to perform simple, point-to-point indexing. You need Ultraware software for drive and indexing configuration.

Select a Motion Interface

Communicate Directly to a Servo Drive

The controller can control servo drives through these motion interfaces:

If Your Application Requires:	Select This Motion Interface:
Rockwell Automation SERCOS interface drives	1768-M04SE

Communicate Over a Network

Some servo drives are supported through communication interface modules. The controller can communicate with these servo drives over these networks:

Drives	EtherNet/IP	DeviceNet	RS-232 Serial	DH-485
1394 GMC drive and control	no	no	yes	yes
2098 Ultra3000 DeviceNet servo drive	no	yes	no	no
2098 Ultra5000 intelligent positioning	no	yes	yes	no

Each drive has different options you order for its supported communication networks. See the appropriate catalog or selection information for a drive to make sure you select the appropriate option when specifying a drive for a specific network.

For more information on drives, motors, and accessories, see the Motion Control Selection Guide, publication GMC-SG001.

Motion Performance

The 1768 CompactLogix controller supports one 1768-M04SE SERCOS interface module for:

- as many as four Kinetix drives and motors.
- as many as two feedback axes.
- as many as six virtual axes.

In a motion application:

- You can have as many as four axes per CompactLogix system. If your solution requires more than four Kinetix drives, consider the ControlLogix platform.
- Trigger an event task via a registration input on a Kinetix drive and the motion task update.

SERCOS Interface Modules

The SERCOS interface servo modules serve as a link between the controller and intelligent, servo drives. SERCOS is the IEC 61491 SErial Real-time COmmunication System protocol over a fiber optic medium. The SERCOS interface is a controller-to-digital drive interface designed for high-speed, real time, serial communications using noise-immune, fiber-optic cables.

The SERCOS interface modules use a single, digital fiber optic link, which eliminates as many as 18 digital wires per axis. Detailed drive status information can be sent from drive to controller and from controller to drive.

The modules are compatible with the RSLogix 5000 motion instructions set and axis configuration utilities. The motion instructions provide a wide range of motion capability, including point-point positioning, gearing, position and time-based camming, and multi-axis linear and circular motion.

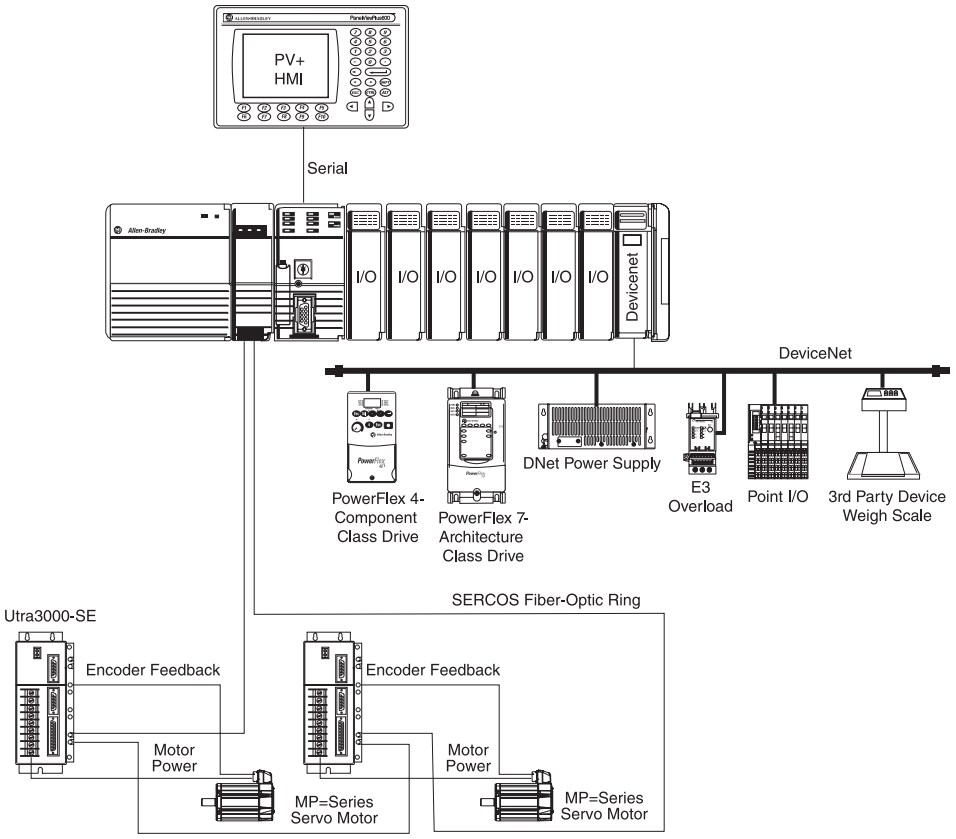
The SERCOS interface modules can connect to these servo drives:

- 2094 Kinetix 6000 servo drive
- 2098 Ultra3000 SERCOS servo drive
- 1394C SERCOS drive
- 8720MC spindle

Cat. No.	Number of Axes, per Module, Max.	Number of Modules per Controller	Power Dissipation	Backplane Current (mA) at 5V	Backplane Current (mA) at 24V	SERCOS Data Rate
1768-M04SE	4 real plus 2 feedback and 6 virtual	1 module	5.04 W	969 mA	0 mA	4 Mbits or 8 Mbits per second

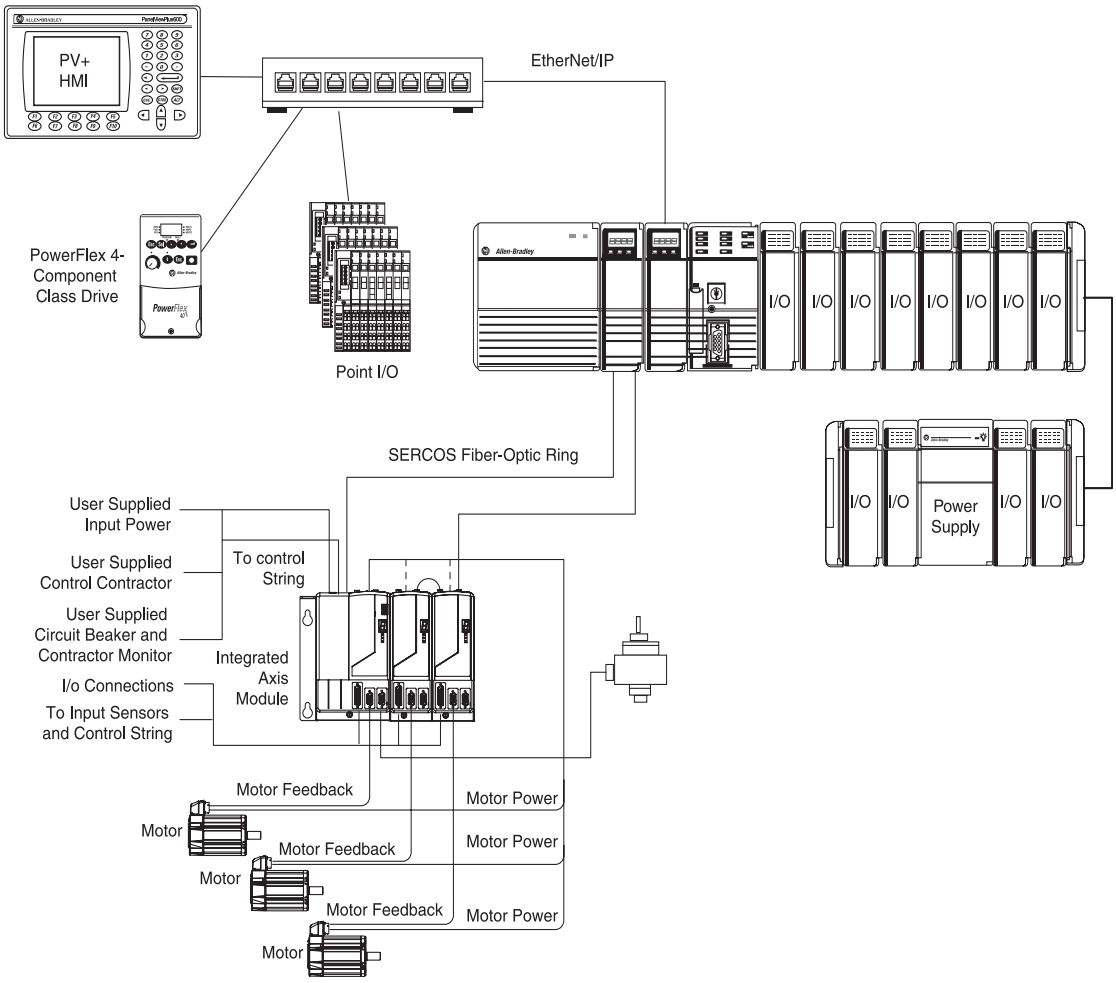
Certifications: UL, CSA (Class I, Division 2, Group A, B, C, D), CE

Typical Configuration - 2-Axis Motion with Ultra3000 Servo Drives



- If you have an auxiliary feedback device that requires encoder feedback, change the Ultra3000 drives to Kinetix 6000 drives.
- If you tie an incremental encoder to a 1769-HSC High-speed Counter module, you cannot use this input as one of the feedback-only axes or tie this input to the motion planner.

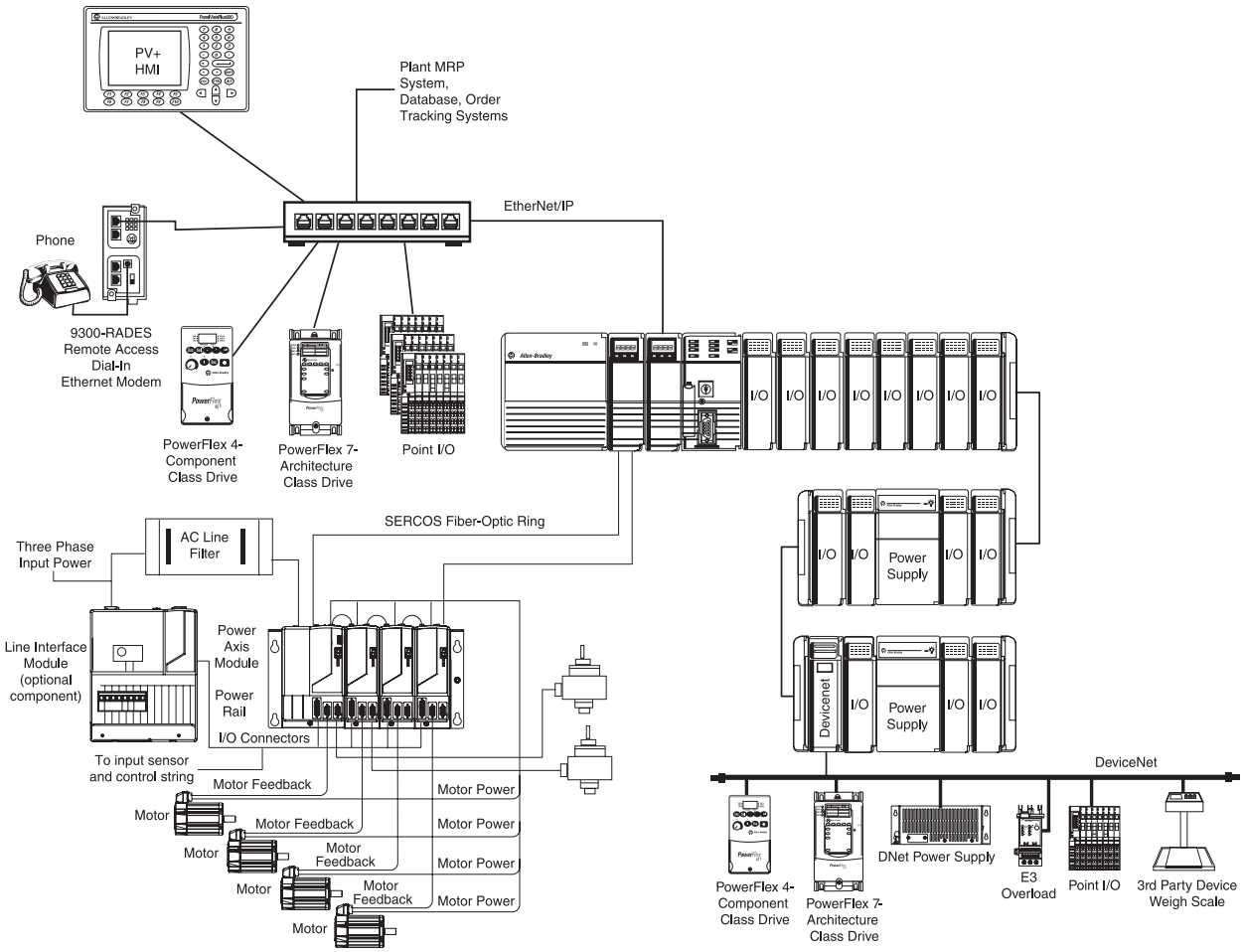
Typical Configuration - 3-Axis Integrated Motion with Kinetix Servo Drives



A 3-axis system with Kinetix drives supports:

- execution of 4 axes per 1 ms.
- velocity bandwidth > 400 Hz and current loop bandwidth > 1000 Hz.
- high resolution, unlimited travel, and absolute feedback features.
- two feedback ports per Kinetix drive.

Typical Configuration - 4-Axis Integrated Motion with Kinetix drives and LIM power interface

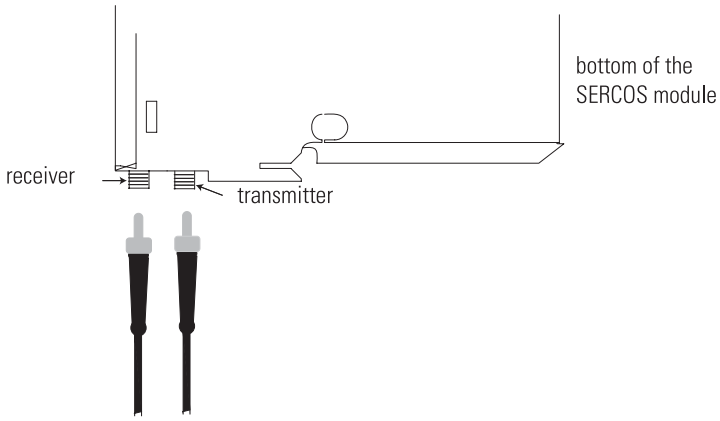


A 4-axis system with Kinetix drives supports:

- execution of 4 axes per 1 ms.
- velocity bandwidth > 400 Hz and current loop bandwidth > 1000 Hz.
- high resolution, unlimited travel, and absolute feedback features.
- two feedback ports per Kinetix drive.
- optional 2094 Line Interface Module (LIM) as the incoming power source for an entire control panel.

Cables for Use with the SERCOS Interface Modules

Both the transmitter and receiver connections use a F-SMA standard plug that conforms to the F-SMA screw type connector.



Select one of these fiber optic cables to connect the SERCOS interface module to the drive.

Cat. No.	Description
2090-SCEPx-x (no jacket) 2090-SCVPx-x (standard jacket) 2090-SCNPx-x (nylon jacket)	**Plastic Fiber Optic Cables** 1000 µm plastic simplex fiber optic cable transmission range of 1...32 m. Allen-Bradley offers plastic, fiber-optic cable assemblies that come in a variety of jackets: • No jacket (Chlorinated Polyethylene) for use inside an electrical cabinet • A standard jacket (Polyvinyl Chloride) for use outside of electrical cabinets • A nylon jacket for use in harsh environments
2090-SCVGx-x	**Glass Fiber Optic Cables**❄ 200 µm glass fiber optic cable transmission range of 1...200 m. Allen-Bradley offers glass, fiber-optic cable assemblies that come with a standard jacket (Polyvinyl Chloride) for use in normal environments.

The x-x determines the length in meters. Specify 0-1 for 0.1m, 0-3 for 0.3m, 1-0 for 1m, 3-0 for 3m, 5-0 for 5m, 8-0 for 8m, 10-0 for 10m, 15-0 for 15m, 20-0 for 20m, 25-5 for 25m, or 32-0 for 32m.
❄The x-x determines the length in meters. Specify 50-0 for 50m, 100-0 for 100m, 150-0 for 150m, or 200-0 for 200m.

Step 3 - Select:

- *Networks*
- *Communication interfaces*
- *Associated cables and network equipment*

Network Communications

You use separate interface modules to connect to different networks.

- The 1768-L43 controller has a built-in serial port.
- Add a 1768-ENBT module for EtherNet/IP communications.
- Add a 1769-SDN scanner to connect to DeviceNet devices.

The individual communication interface modules allow for more system flexibility, greater communications connections, and more distributed I/O connections.

NetLinx Open Network Architecture

NetLinx Open Network Architecture is the Rockwell Automation strategy of using open networking technology for seamless, top-floor to shop-floor integration. The NetLinx-based networks – DeviceNet, ControlNet, and EtherNet/IP – all use the Common Industrial Protocol, so they speak a common language and share a universal set of communication services. NetLinx architecture, part of the Integrated Architecture, seamlessly integrates all the components in an automation system from a few devices on one network to multiple devices on multiple networks including access to the Internet – helping you to improve flexibility, reduce installation costs, and increase productivity.

- The EtherNet/IP network is an open industrial networking standard that supports implicit and explicit messaging and uses commercial, off-the-shelf Ethernet equipment and physical media.
- The ControlNet network allows intelligent, high-speed control devices to share the information required for supervisory control, work-cell coordination, operator interface, remote device configuration, programming, and troubleshooting.
- The DeviceNet network offers low-cost, high-speed access to plant-floor data from a broad range of plant-floor devices and a significant reduction in wiring.

Select a Network

You can configure your system for information exchange between a range of devices and computing platforms and operating systems. Select a CompactLogix controller with integrated communications or the appropriate communication device for the networks that meet your needs:

If Your Application Requires	Use This Network	Select
• Plant management • Configuration, data collection, and control on a single, high-speed network • Time-critical applications with no established schedule • Data sent regularly • Internet/Intranet connection	EtherNet/IP	1768-ENBT scanner
• Connections of low-level devices directly to plant floor controllers, without interfacing them through I/O modules • Data sent as needed • More diagnostics for improved data collection and fault detection • Less wiring and reduced start-up time than a traditional, hard-wired system	DeviceNet	1769-SDN scanner 1761-NET-DNI interface 1769-ADN adapter
• Modems • Supervisory control and data acquisition (SCADA) • Manipulate ASCII data	Serial	built-in serial port on all CompactLogix controllers 1769-ASCII module
• Connections to existing DH-485 networks	DH-485	built-in serial port with a 1761-NET-AIC

A ControlNet option is not currently available for the 1768 CompactLogix controller, but it is planned to be available at the Logix V16 release.

EtherNet/IP Network

The Ethernet Industrial (EtherNet/IP) network protocol is an open industrial networking standard that supports both real-time I/O messaging and message exchange. It emerged due to the high demand for using the Ethernet network for control applications. The EtherNet/IP network uses off-the-shelf Ethernet communication chips and physical media.

The EtherNet/IP network provides excellent drive and I/O control performance along with HMI information processing and many commercial technologies.

Select an EtherNet/IP Interface

Select the appropriate controller and EtherNet/IP interface depending on the application and how the controller interacts with the devices:

If Your Application	Select this Interface	Description
• Controls I/O modules • Requires an adapter for distributed I/O on EtherNet/IP links • Communicates with other EtherNet/IP devices (messages) • Bridges EtherNet/IP links to route messages to devices on other networks	1768-ENBT	The 1768-ENBT module: • controls I/O over an EtherNet/IP network. • routes messages to devices on other networks. • sends real-time, connected, peer-to-peer data between multiple controllers. • sends and receives email.
• Sends and receives messages over the EtherNet/IP network • Transfers small amounts of data over the EtherNet/IP network	1761-NET-ENI interface, series B	The 1761-NET-ENI series B interface module routes a DF1 message received from the attached controller to a compatible destination TCP/IP device. This is accomplished by using DF1 node addresses 0 to 49. The 1761-NET-ENI node addresses 100 to 149 store TCP/IP destination addresses. When the 1761-NET-ENI receives a write message to nodes 100 to 149, it stores the TCP/IP destination address in the corresponding map register.

EtherNet/IP Interface Specifications

Cat. No.	Communication Rate	Connections Supported, Max.	Number of Modules per Controller	Connector	Power Dissipation	Backplane Current (mA) at 5V	Backplane Current (mA) at 24V
1768-ENBT	10/100 MB	Each module supports a maximum of: • 128 Logix (CIP) connections (I/O and information) • 64 TCP/IP connections • 5000 messages/s	two 1768 modules per controller	RJ-45	4.38 W	834 mA	0 mA
1761-NET-ENI	10/100 MB❄	6 TCP/IP connections	one interface per serial port	RJ-45	—	0 mA	50 mA

Certifications: UL, CSA (Class I, Division 2, Group A, B, C, D), CE
The 1768-L43 controller supports a maximum of two 1768 modules.
❄The 1761-NET-ENI is an Ethernet to serial linking device. While 10 MB is the fastest communication rate supported by a 1761-NET-ENI device, the actual network performance depends on the maximum serial port connection speed.

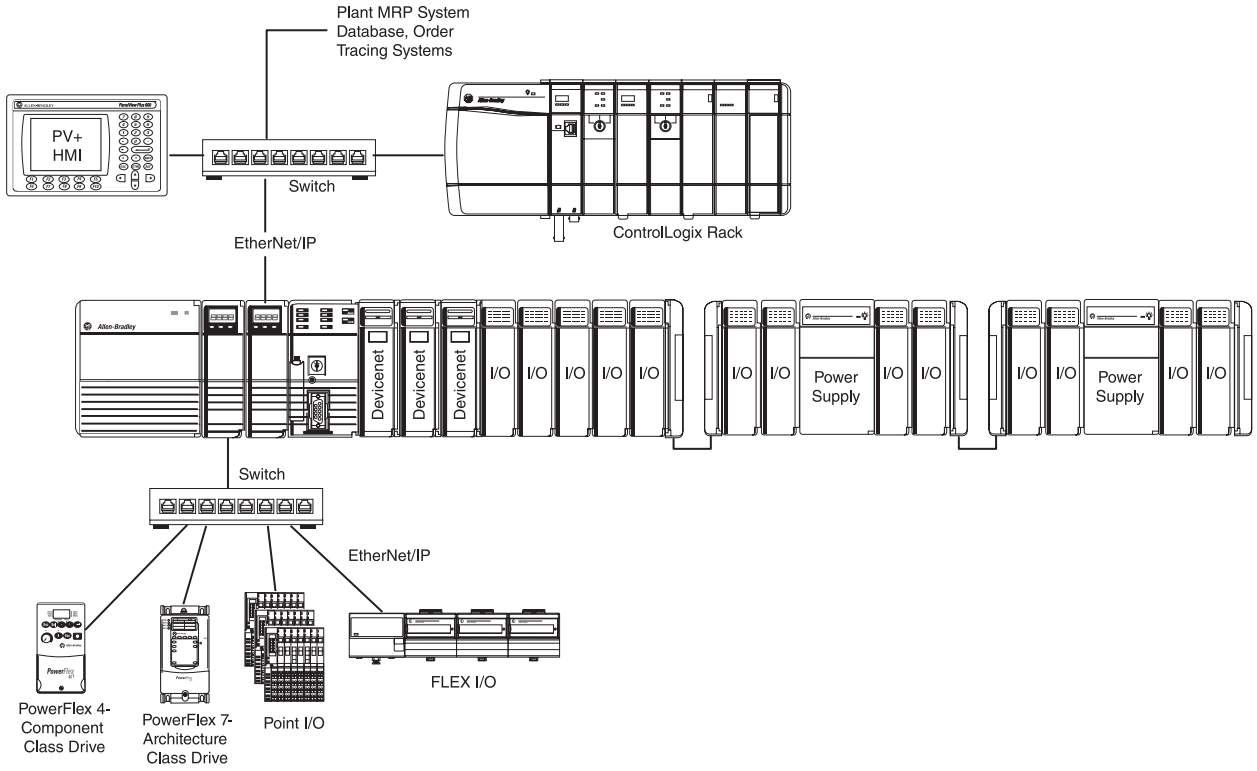
EtherNet/IP Product Compatibility

Originator	Recipient: EtherNet/IP PLC-5 or SLC 5/05 Processor	1785-ENET Module	Logix5000 Controller	1794-AENT FLEX I/O Adapter	1734-AENT POINT I/O Adapter	1761-NET-ENI Interface	PanelView Plus EtherNet/IP Terminal	RSLinx Software	1761-NET-ENI Interface
EtherNet/IP PLC-5 or SLC 5/05 Processor	information	information	information	not supported	not supported	information	information	information	information
1785-ENET Module	information	information	information	not supported	not supported	information	information	information	information
Logix5000 Controller	information	information	information I/O data interlocking	I/O data	I/O data	information	information I/O data	information	information
1761-NET-ENI Interface❄	information	information	information	not supported	not supported	information	information	information	information
PanelView Plus EtherNet/IP Terminal	information	information	information I/O data	na	na	information	na	na	information
RSLinx Software	information	information	information	not supported	not supported	information	na	information	information

For EtherNet/IP control:
- a ControlLogix controller requires a 1756-ENBT or 1756-ENET series B scanner.
- a FlexLogix controller requires a 1788-ENBT scanner.
- a CompactLogix controller must be a 1769-L32E or 1769-L35E controller or be a 1768-L43 controller with a 1768-ENBT scanner.
- the PC for a SoftLogix5800 controller requires appropriate hardware for Ethernet communications.

❄To be an originator, the 1761-NET-ENI interface must connect to the other device through that device's RS-232 port.

Typical EtherNet/IP Configuration



DeviceNet Network

The DeviceNet network is an open low-level network that provides connections between simple industrial devices (such as sensors and actuators) and higher-level devices (such as PLC controllers and computers). The DeviceNet network uses the proven Common Industrial Protocol (CIP) to provide the control, configure, and data collection capabilities for industrial devices. The DeviceNet network is a flexible network that works with devices from multiple vendors.

Select a DeviceNet Interface

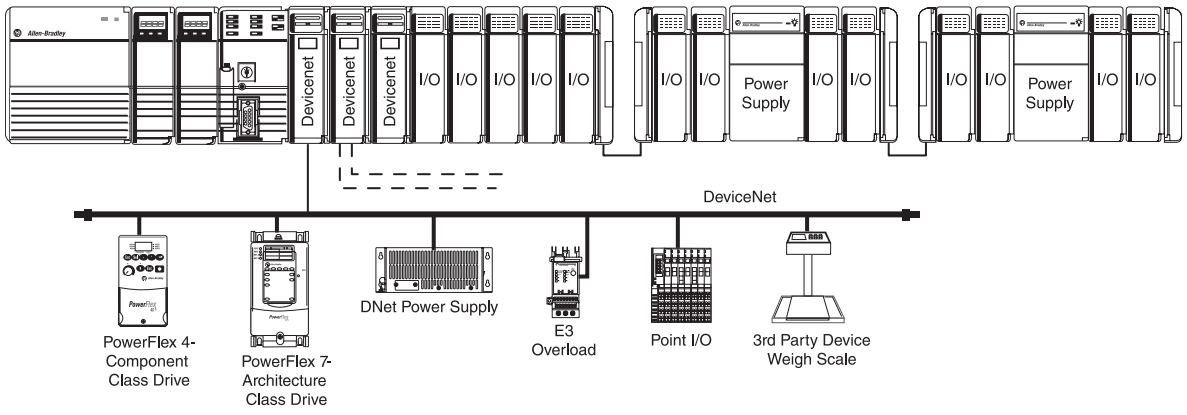
If Your Application	Select This Interface	Description
• Communicates with other DeviceNet devices (I/O and messages) • Requires explicit messaging • Uses the controller as a master or slave on the DeviceNet network • Uses the controller serial port for other communications • Requires higher performance than available from the 1769-NET-DNI interface	1769-SDN DeviceNet scanner	The scanner acts as an interface between DeviceNet devices and the CompactLogix controller. The scanner lets the controller: • read inputs from slave devices. • write outputs to slave devices. • send and receive messages.
• Communicates with other DeviceNet devices (messaging only) • Uses the controller only as a slave on the DeviceNet network • Does not use the controller serial port for other communications • Trades lower cost for lower performance than the 1769-SDN scanner	1761-NET-DNI interface	The interface module links the CompactLogix controller to other devices on a DeviceNet network to: • download configuration data to a device. • monitor operational status of a device. • communicate with peer devices (messaging). • upload/download programs.
• Accesses remote Compact I/O over a DeviceNet network • Sends remote I/O data for as many as 30 modules back to scanner or controller	1769-ADN DeviceNet adapter	The adapter: • interfaces with as many as 30 Compact I/O modules. • communicates to other network system components (typically a controller or scanner and/or programming terminals).

DeviceNet Interface Specifications

Cat. No.	Communication Rate	Cable	DeviceNet Power Requirements, Max.	Power Consumption (W) at 24V	Backplane Current (mA) at 5V	Backplane Current (mA) at 24V	Power Supply Distance Rating
1769-SDN	125 Kbps 250 Kbps 500 Kbps	Allen-Bradley part number 1485C-P1-Cxxx	90 mA @ 11V dc 110 mA @ 25V dc (N.E.C. Class 2)	2.2	440 mA	— mA	4 modules
1761-NET-DNI			11…25V dc	—	0 mA	200 mA	na
1769-ADN/B			90 mA @ 24V dc (+4%) (N.E.C. Class 2)	2.5	450 mA	— mA	5 modules
1769-ADN/A ❄			90 mA @ 24V dc (+4%) (N.E.C. Class 2)	2.5	450 mA	— mA	4 modules

Certifications: UL, CSA (Class I, Division 2, Group A, B, C, D), CE, FM, C-Tick
The 1761-NET-DNI is a DeviceNet to serial linking device. The actual network performance depends on the maximum serial port connection speed.
❄The series A 1769-ADN adapter does not support the 1769-OA16, 1769-OW16, 1769-IF4XOF2, or 1769-HSC modules.

Typical DeviceNet Configuration



The 1768 CompactLogix system supports multiple 1769-SDN scanners.

Serial Network

The serial port is compatible with RS-232 serial communication. The serial port supports the DF1 protocol to communicate with other devices on the serial link. You can select:

Use This DF1 Mode	For
Point to point	Communication between a controller and other DF1-compatible devices using DF1 full-duplex protocol
DF1 master	Control of polling and message transmission between the master and each slave using DF1 half-duplex polled protocol
DF1 slave	Using the controller as a slave station in a master/slave serial network using DF1 half-duplex protocol
User mode (ASCII)	Communication between a controller and an ASCII device, such as a bar code reader

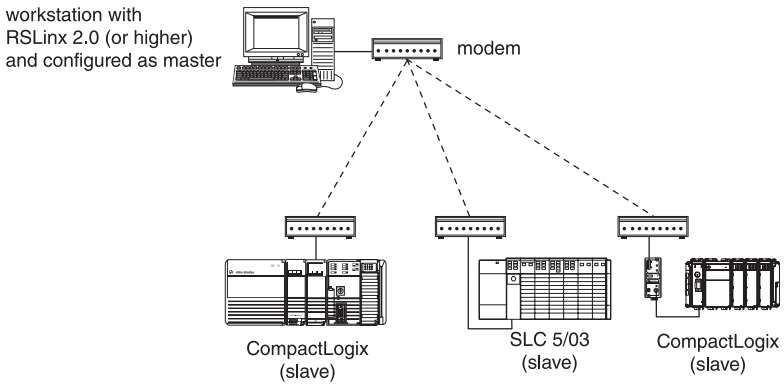
The serial port is Channel 0 and is fully isolated. The serial channel supports DF1, DH-485, and ASCII protocols.

1769-ASCII Serial Gateway Module

The 1769-ASCII module, a general purpose two-channel ASCII interface, provides a flexible network interface to a wide variety of RS-232, RS-485, and RS-422 ASCII devices. The module provides the communication connections to the ASCII device.

Cat. No.	Channel Configuration	Message Length, Max.	Backplane Current (mA) at 5V	Power Supply Distance Rating
1769-ASCII	RS-232, RS-422, or RS-485	200 characters	500 mA	4 modules

Typical Serial Configuration



Modbus Support

To use Logix5000 controllers on Modbus, you connect through the serial port and execute a specific ladder logic routine. The controller project is available with RSLogix 5000 Enterprise programming software. For more information, see Using Logix5000 Controllers as Masters or Slaves on Modbus Application Solution, publication CIG-AP129.

DH-485 Network

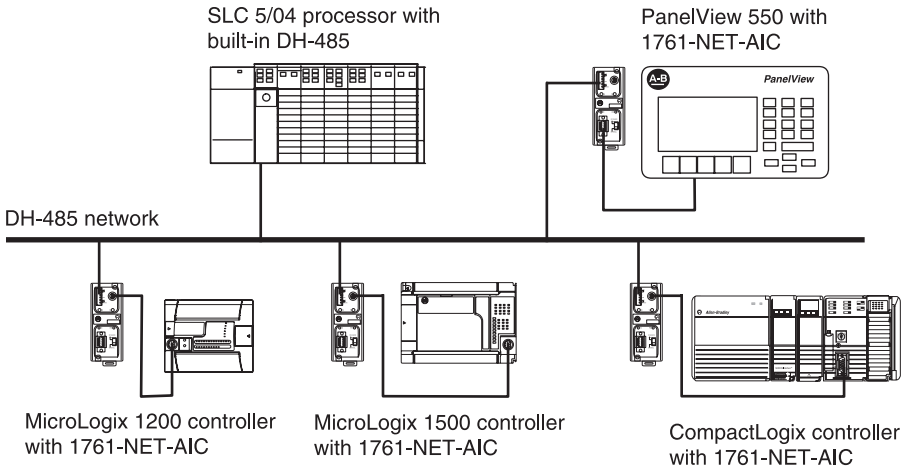
On the DH-485 network, the controller can send and receive messages to and from other controllers on the network. The DH-485 connection does support remote programming and monitoring via RSLogix 5000 software. However, excessive traffic over a DH-485 connection can adversely affect overall performance and can lead to timeouts and loss in RSLogix 5000 configuration performance.

Important: Only use Logix5000 controllers on DH-485 networks when you want to add controllers to an existing DH-485 network. For new applications with Logix5000 controllers, networks in the NetLinx open architecture are the recommended networks.

You need a 1761-NET-AIC+ converter for each controller you want to put on the DH-485 network. You can have two controllers per one 1761-NET-AIC+ converter, but you need a different cable for each controller. Connect one controller to port 1 (9-pin connector) and one controller to port 2 (mini-DIN connector).

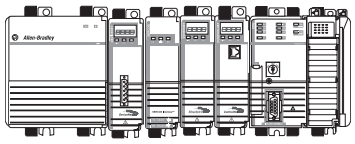
To Connect to This Port	Use This Cable
Port 1 DB-9 RS-232, DTE connection	1747-CP3 or 1761-CBL-AC00
Port 2 mini-DIN 8 RS-232 connection	1761-CBL-AP00 or 1761-CBL-PM02

Typical DH-485 Configuration



Step 4 - Select:

- *A controller with sufficient memory*
- *A 1784-CF64 CompactFlash card*
- *No batteries required*



1768 CompactLogix Controllers

The 1768 CompactLogix controller provides a scalable controller solution that supports SERCOS motion, the EtherNet/IP and DeviceNet networks, and can address a maximum of 16 local 1769 I/O modules.

The 1768 CompactLogix controllers can monitor and control I/O across the 1769 CompactBus, as well as over distributed I/O links. CompactLogix controllers can communicate with computers or other processors across RS-232-C (DF1/DH-485 protocol), DeviceNet, and EtherNet/IP networks. To provide communication for a CompactLogix controller, install the appropriate interface module.

The multi-tasking operating system supports as many as 16 configurable tasks that can be prioritized. Only one task can be continuous. The others must be periodic or event tasks. Each task can have as many as 32 programs, each with its own local data and logic, allowing virtual machines to operate independently within the same controller. The 1768 CompactLogix controllers support as many as 16 tasks.

Specification	Description
Power Supply	1768-PA3
Nonvolatile Memory	1784-CF64 CompactFlash card
Supported Programming Languages	Relay ladder Function block diagram Structured text Sequential function chart
Programming Cable	1756-CP3 directly to controller 1747-CP3 directly to controller

Certifications: UL, CSA (Class I, Division 2, Group A, B, C, D), CE, C-Tick

1768 CompactLogix Controllers

Cat. No.	Available User Memory (KB)	Nonvolatile Memory	Number of Concurrent Tasks	Communication Ports	Backplane Current (mA) at 5V	Backplane Current (mA) at 24V	Backplane Current Output	Power Dissipation	Capacity	I/O Banks Supported, Max.
1768-L43	2 MB	64 MB CompactFlash	16	1 RS-232 port	0 A	1.3 A	1768 backplane • 2.0 A @ 5.2V • 1.0 A @ 24V 1769 backplane • 2.8 A @ 5.2V	6.3 W	• two 1768 modules • sixteen 1769 modules	3

Available user memory is the amount of memory available to the user after RSLogix 5000 Enterprise Series software is connected and a null program is loaded.

1768 Controller Design

The 1768 CompactLogix controller is the rightmost module in the 1768 backplane. In addition to the controller, you can have a maximum of two 1768 modules. These modules can be combination of:

- two 1768 ENBT EtherNet/IP modules, **or**
- one 1768 ENBT EtherNet/IP module and one 1768-M04SE SERCOS interface module.

The 1768 system supports a maximum of only one 1768-M04SE SERCOS interface module.

Estimate Controller Memory Use

The following equations provide an estimate of the memory needed for a controller.

Controller tasks	_____ * 4000	=	_____ bytes (minimum 1 task)
Digital I/O points	_____ * 400	=	_____ bytes
Analog I/O points	_____ * 2600	=	_____ bytes
Communication modules	_____ * 2000	=	_____ bytes
Motion axes	_____ * 8000	=	_____ bytes

When estimating memory use by communication modules, count all the communication modules in the system, not just those in the local chassis. This includes device connection modules, adapter modules, and ports on PanelView terminals.

1784-CF64 CompactFlash Card

The 1784-CF64 card offers nonvolatile memory (flash) to permanently store a user program and tag data on a controller. You can:

- manually trigger the controller to save to or load from nonvolatile memory.
- configure the controller to load from nonvolatile memory when you cycle power.

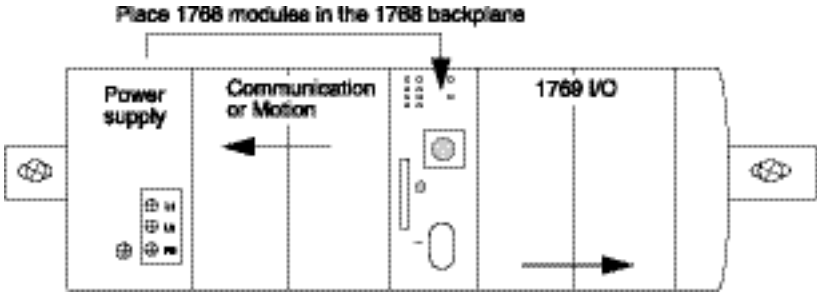
No Battery Required

The 1768 controller **does not** require a battery. The controller uses internal flash memory to store its program during shutdown. Energy stored in the 1768 power supply maintains controller power long enough to store the program to internal flash memory (not the external CompactFlash card).

Controller Placement

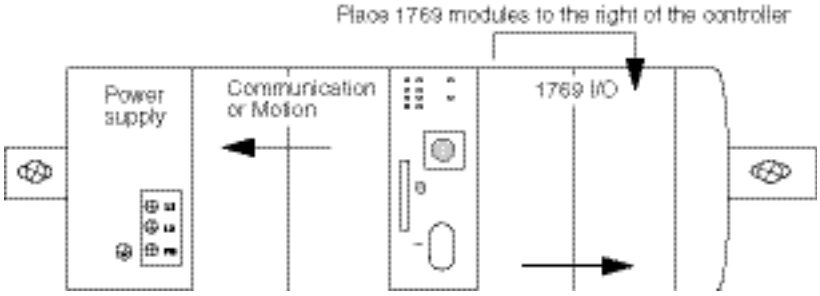
Follow these guidelines as you place modules in the 1768 backplane:

- The 1768 power supply must be the leftmost module in the 1768 backplane.
- The controller must be the rightmost module in the 1768 backplane.
- As many as two additional 1768 modules can be between the controller and power supply.



Follow these guidelines as you place 1769 modules to the right of the 1768 backplane:

- As many as eight 1769 modules can be attached to the right of the 1768 system.
- The 1769 I/O connected directly to the 1768 backplane does not need a 1769 power supply. **Never** put a 1769 power supply in the 1768 system. Putting a 1769 power supply in the 1768 system causes the controller to generate a major fault that can not be cleared until you remove the 1769 power supply.
- Additional 1769 modules must be in additional I/O banks.
- Each additional I/O bank must have its own power supply. Use a standard 1769 power supply, such as 1769-PA4.



1768 Controller Compatibility

Control Distributed I/O Modules

The 1768 CompactLogix controller can control these distributed I/O modules.

I/O Modules	1768-ENBT EtherNet/IP	1769-SDN DeviceNet❄
1756 ControlLogix I/O	yes	yes
1794 FLEX I/O	yes	yes
1797 FLEX Ex I/O‡	yes	no
1734 POINT I/O	yes	yes
1734D POINTBlock I/O	yes	yes
1769 Compact I/O	no	yes
1790 Compact Block LDX I/O	no	yes
1791D CompactBlock I/O	no	yes
1792 ArmorBlock I/O	no	yes
1792D ArmorBlock MaXum I/O	no	yes
1798 FLEX Armor I/O	no	yes
1799 Embedded I/O	no	yes
1746 I/O	no	no
1771 I/O	no	no

The 1768 CompactLogix controller requires a 1768-ENBT module to connect to an EtherNet/IP network.
❄Use a 1769-SDN scanner to connect the controller to the DeviceNet network.
‡Insert a 1797-BIC and 1797-CEC module pair to isolate the FLEX Ex I/O modules from the non-intrinsically safe portion of the system.

Communicate with Display Devices

The 1768 CompactLogix controller can communicate with these display devices.

Display Devices	EtherNet/IP	DeviceNet❄	RS-232 (DF1)	DH-485
2711P PanelView Plus terminal	yes	yes	yes	yes
6182H VersaView CE computer	yes	yes	yes	yes
2711 PanelView terminal	yes	yes	yes‡	yes‡
2711 e PanelView terminal	no	no	no	no
2705 RediSTATION/RediPANEL operator module	no	yes	no	no
2706 InView message display	yes	yes	yes	yes
2706 DL40 Dataliner message display	no	no	yes	no
2706 DL, DL50 DataLiner message display	no	no	yes	no
2707 DTAM Plus operator interface	no	yes	yes‡	yes‡

The 1768 CompactLogix controller requires a 1768-ENBT module to connect to an EtherNet/IP network.
❄Use a 1769-SDN scanner to connect the controller to the DeviceNet network.
‡Use PLC/SLC mapping.

Communicate with Other Controllers

The 1768 CompactLogix controller can communicate with these controllers.

Controller	EtherNet/IP	DeviceNet❄	RS-232 (DF1)	DH-485
1756 ControlLogix	yes	yes	yes	yes
1769 CompactLogix	yes	yes	yes	yes
1789 SoftLogix5800	yes	yes	yes	no
1794 FlexLogix	yes	yes	yes	yes
5720 PowerFlex 700S DriveLogix	yes	yes	yes	no
1785 PLC-5	yes‡§	yes♣	yes	na
1747 SLC	yes	yes♣	yes	yes
1761 MicroLogix	yes	yes♣	yes	yes
1762 MicroLogix	yes	yes♣	yes	yes
1769 MicroLogix	yes	yes♣	yes	yes
1772 PLC-2	na	na	yes⌘	na
1775 PLC-3	na	na	yes✦	na
5250 PLC-5/250	no	na	yes	na

For EtherNet/IP control:
- a ControlLogix controller requires a 1756-ENBT module.
- a FlexLogix controller requires a 1788-ENBT card.
- a 1768 CompactLogix controller requires a 1769-ENBT module.
- a 1769 CompactLogix controller must be a 1769-L32E or 1769-L35E controller.
- the PC for a SoftLogix5800 controller requires appropriate hardware for Ethernet communications.

❄For DeviceNet access, use either a 1769-SDN scanner (control I/O and send/receive messages) or a 1761-NET-DNI interface (messaging bridge).
‡The Ethernet PLC-5 processor must be one of these:
- series C, revision N.1 or later.
- series D, revision E.1 or later.
- series E, revision D.1 or later.

§The 1785-ENET Ethernet communication interface module must be series A, revision D or later.
♣The PLC-5, SLC, and MicroLogix processors appear as I/O points to the Logix controller. Requires 1761-NET-DNI DeviceNet interface. Use a 1747-L55x controller with OS501 or later.
⌘The PLC-2 controller requires a 1771-KG module for serial (DF1) communications.
✦The PLC-3 controller requires a 1775-KA module for serial (DF1) communications.

Communicate with Other Communication Devices

The 1768 CompactLogix controller can communicate with these communication devices.

Communication Device	EtherNet/IP	DeviceNet❄	RS-232 (DF1)	DH-485
9355 RSLinx software	yes	yes	yes	yes
1784-KTC, -KTCx, -KTCx15, -PCIC(S), -PCC	na	na	na	na
1784-PCIDS, -PCD	na	yes	na	na
1788-CN2DN	na	yes	na	na
1788-EN2DN	yes	yes	na	na
1788-CN2FF	na	na	na	na
1203-CN1 ControlNet module‡	na	na	na	na
1203-FM1/FB1 SCANport§	na	na	na	na

The 1768 CompactLogix controller requires a 1768-ENBT module to connect to an EtherNet/IP network.
❄For DeviceNet access, use either a 1769-SDN scanner (control I/O and send/receive messages) or a 1761-NET-DNI interface (messaging bridge).
‡Use the generic module configuration to configure the 1203-CN1 module and a CIP generic MSG instruction to communicate with the module.
§Use a CIP generic MSG instruction to communicate with the 1203-FM1 SCANport module on a DIN rail that is remote to the controller. The remote DIN rail also requires a 1794-ACN(R)15 ControlNet adapter.

How a Logix System Uses Tasks

A Logix controller uses three types of tasks. Use the following table to choose the appropriate type of task for each section of your logic.

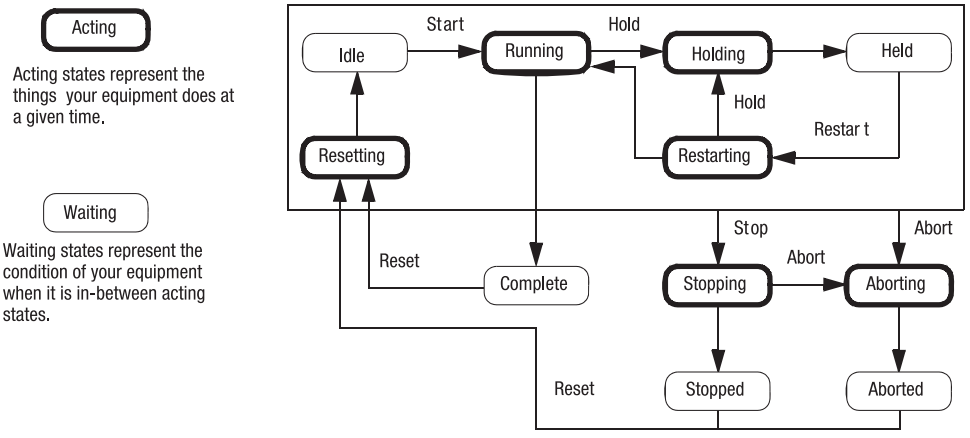
To Execute a Section of Logic	Use This Type of Task	Description
All of the time	Continuous task	The continuous task runs in the background. Any CPU time not allocated to other operations (such as motion, communications, and other tasks) is used to execute the programs in the continuous task. • The continuous task runs all the time. When the continuous task completes a full scan, it restarts immediately. • A project does not require a continuous task. If used, there can be only one continuous task.
• At a constant period (e.g., every 100 ms) • Multiple times within the scan of your other logic	Periodic task	A periodic task performs a function at a specific period. • Whenever the time for the periodic task expires, the task interrupts any lower priority tasks, executes one time, and then returns control to where the previous task left off. • You can configure the time period from 0.1 ms to 2000 ms. The default is 10 ms. It is also controller and configuration dependent. • The performance of a periodic task depends on the type of Logix controller and on the logic in the task.
Immediately when an event occurs	Event task	An event task performs a function only when a specific event (trigger occurs. In a 1768 CompactLogix controller, the trigger for the event task can be: • certain motion operations. • consumed tag. • EVENT instruction.

Program Equipment Phases

The PhaseManager option of RSLogix 5000 software gives you a state model for your equipment. It includes the following components:

- Phase to run the state model
- Equipment phase instructions for programming the phase
- PHASE data type to link the phase to other equipment and higher-level systems

PhaseManager uses the following states:



To develop PhaseManager programs, you need:

- Logix5000 controller with firmware revision 15.0 or later
- Communication path to the controller
- RSLogix 5000 software version 15.0 or later

How a Logix System Uses Connections

A Logix system uses a connection to establish a communication link between two devices. Connections can be:

- Controller to local I/O modules or local communication modules
- Controller to remote I/O or remote communication modules
- Controller to remote I/O (rack-optimized) modules
- Produced and consumed tags
- Messages

You indirectly determine the number of connections the controller uses by configuring the controller to communicate with other devices in the system.

Method	Description
Unscheduled connection • Deterministic	An unscheduled connection is a message transfer between controllers that is triggered by the Requested Packet Interval (RPI) or the program (such as a MSG instruction). Unscheduled messaging lets you send and receive data when needed. All EtherNet/IP connections are unscheduled.
Unconnected message • Least deterministic	An unconnected message is a message that does not require connection resources. An unconnected message is sent as a single request/response.

1768 CompactLogix Connections

In a 1768 CompactLogix system, the only connections to consider are those associated with each 1768-ENBT module in the system.

Each	Supports This Number of Connections
1768-ENBT	128 Logix (CIP) connections (all connections are unscheduled) 64 TCP/IP connections

The total connection requirements for a 1768 CompactLogix system include both local and remote (distributed) connections. Tallying local controller connections is not an issue because the controllers supports all the connections required for the maximum number of I/O modules and 1769-SDN scanners in one system. It is important to tally remote (distributed) connections via the EtherNet/IP network because each 1768-ENBT scanner supports 64 connections.

Connections for Produced and Consumed Tags

The controller supports the ability to produce (broadcast) and consume (receive) system-shared tags over EtherNet/IP networks. Produced and consumed tags each require connections.

This Type of Tag	Requires These Connections
Produced	A produced tag allows other controllers to consume the tag, which means that a controller can receive the tag data from another controller. The local controller (producing) uses one connection for the produced tag and one connection for each consumer. The controller's communication device uses one connection for each consumer. As you increase the number of controllers that can consume a produced tag, you also reduce the number of connections the controller and communication device have available for other operations, like communications and I/O.
Consumed	Each consumed tag requires one connection for the controller that is consuming the tag. The controller's communication device uses one connection for each consumer.

For two controllers to share produced or consumed tags, both controllers must be attached to the same Ethernet/IP network. You cannot bridge produced and consumed tags over two networks.

The total number of tags that can be produced or consumed is limited by the number of available connections in the 1768-ENBT module.

Connections for Messages

Messages transfer data to other devices, such as other controllers or operator interfaces. Some messages use unscheduled connections to send or receive data. These connected messages can leave the connection open (cache) or close the connection when the message is done transmitting.

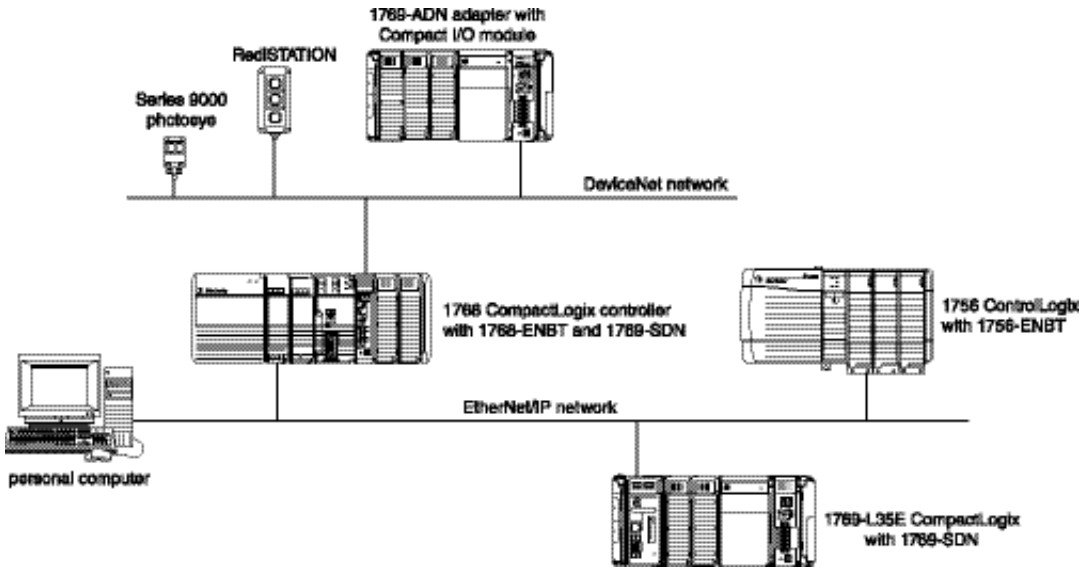
Each message uses one connection, regardless of how many devices are in the message path. To conserve connections, you can configure one message to read from or write to multiple devices.

Connections Example

You do not need to consider any connections between the 1768 controller and its 1769-SDN scanners. The controller supports multiple 1769-SDN sacnners.

In this example system the 1768-L43 controller:

- sends and receives messages to/from the 1756 ControlLogix controller and the 1769-L35E CompactLogix controller over the EtherNet/IP network.
- controls remote I/O devices on the EtherNet/IP network.
- produces one tag that the 1756 ControlLogix controller consumes.
- is programmed via RSLogix 5000 programming software.



The 1768-ENBT module in this example 1768 CompactLogix system uses these connections.

Connection Type	Quantity	Connections per Module	Total Connections
Controller to RSLogix 5000 programming software	1	1	1
Message to 1756 ControlLogix controller	1	1	1
Message to 1769-L35E controller	1	1	1
Controller to 1769-SDN scanner	1	na	na
Produced tag Consumed by 1756 ControlLogix controller	1	1	1
Total			4

Determine Total Connection Use

The total connection requirements for a 1768 CompactLogix system include both local and remote (distributed) connections. Tallying local controller connections is not an issue because the controllers supports all the connections required for the maximum number of I/O modules and 1769-SDN scanners in one system. It is important to tally remote (distributed) connections via the EtherNet/IP network because each 1768-ENBT scanner supports 48 connections.

Connection Type	Device Quantity	Connections per Device	Total Connections
Remote Ethernet communication module configured as a direct (none) connection configured as a rack-optimized connection		0 **or** 1	
Remote I/O module over EtherNet/IP (direct connection)		1	
Produced tag		1	
Each consumer		1	
Consumed tag		1	
Message		1	
Total			

Step 5 - Select:

- *1768 power supply*
- *For more than eight 1769 modules, additional 1769 power supplies as needed*

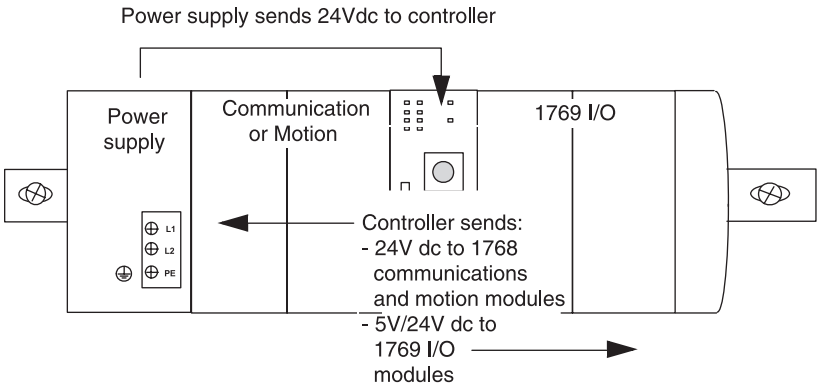
Power Supplies

The 1768 backplane requires one 1768 power supply. The power supply is a dual input supply that operates in multiple ranges:

- 86 to 265V ac
- 108 to 132V dc

The power supply also offers a 24V dc external power source. The CompactLogix power supply requires that a 1768 CompactLogix controller be installed to power the system.

- The power supply sends 24V dc to the controller located in slot 0.
- The controller converts the 24V dc to 5V dc and 24V dc and distributes it as needed:
  - 5V/24V power to 1769 I/O modules on the right side of the controller
  - 24V power to communication or motion modules on the left side of the controller



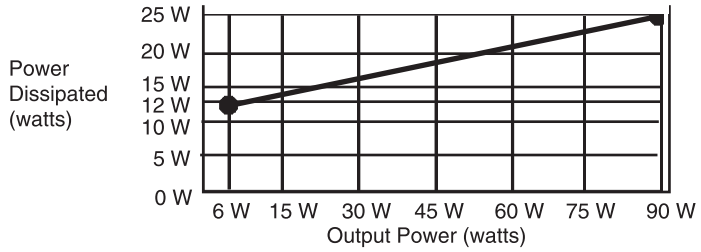
The 1768 modules do not have a distance rating to the 1768 power supply. For the 1769 I/O modules in the 1768 system, the distance rating is from the controller and not the 1768 power supply.

Select 1768 Power Supplies

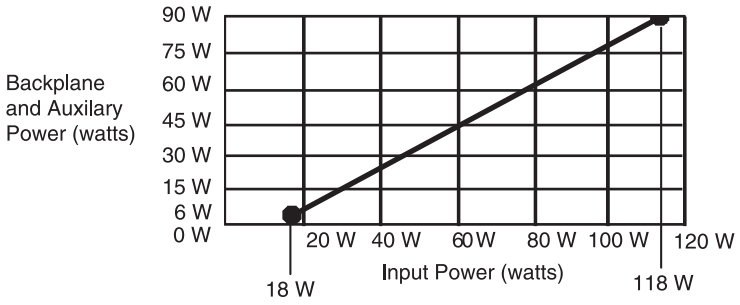
Cat. No.	Description	Backplane Current	Power Consumption, Max.	24V dc User Power Capacity (0 ...60 C)	Inrush Current, Max.	Line Loss Ride Through
1768-PA3	85…265 V ac 108…132 V dc	Supports: • one 1768 controller (required) • as many as two additional 1768 modules For: • total current 3.5A @ 24 V dc	120 VA/120 W, line harmonics Per EN61000-3-2	250 mA	20 A @ 125V ac 20 A @ 120V dc 37 A @ 240V ac	5 ms...10 s

1768 Power Requirements and Transformer Sizing

Power Dissipation



Input Power Requirements



Select 1769 I/O Power Supplies

Each additional bank of I/O modules requires a 1769 power supply. Place 1769 I/O modules to the left or the right of the 1769 power supply. As many as eight I/O modules can be placed on each side of the power supply.

Each 1769 module also has a power supply distance rating (the number of modules from the power supply). Each module must be located within its distance rating. See the specifications for the module to determine its distance rating.

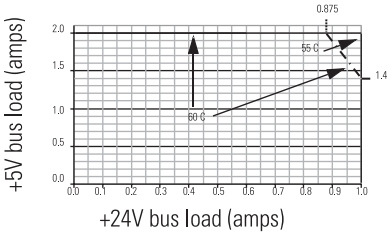
Cat. No.	Description	Operating Voltage Range	Power Consumption, Max.	Current Capacity	24V dc User Power Capacity (0° to 55°C)	Inrush Current, Max.	Line Loss Ride Through	Short Circuit Protection	Over voltage Protection	Isolation Voltage	Power Supply Distance Rating
1769-PA2	Compact 124/240V ac Expansion Power Supply	85…265V ac (wide range; no jumper or DIP switch required), 47…63 Hz	100 VA @ 120V ac 130 VA @ 240V ac	2.0 A @ 5V 0.8 A❄ @ 24 V	250 mA	25 A @ 132V ac 10 Ω source impedance 40 A @ 265V ac 10 Ω source impedance	10 ms…10 s	Yes	for both +5V dc and for +24V dc	Yes	8 modules
1769-PB2	Compact 24V dc Expansion Power Supply	19.2…31.2V dc	50 VA @ 24V dc	2.0 A @ 5V 0.8 A❄ @ 24 V	—	30 A @ 31.2V dc	10 ms…10 s	Yes		Yes	
1769-PA4	Compact 124/240V ac Expansion Power Supply	85…132V ac or 170…265V ac (switch selectable), 47…63 Hz	200 VA @ 120V ac 240 VA @ 240V ac	4.0 A♣ @ 5V 2.0 A @ 24 V	—	25 A @ 132V ac 10 Ω source impedance 40 A @ 265V ac 10 Ω source impedance	5 ms…10 s	Yes		Yes	
1769-PB4	Compact 24V dc Expansion Power Supply	19.2…32V dc	100 VA @ 24V dc	4.0 A⌘ @ 5V 2.0 A✦ @ 24 V	—	30 A @ 31.2V dc	5 ms…10 s	Yes		Yes	

2000 mA @ 5V (0…55 °C)
2000 mA @ 5V (55…60 °C)
❄800 mA @ 24V (0…55 °C)
800 mA @ 24V (55…60 °C)
‡Up to 8 I/O modules can be connected on either side of the power supply for a maximum of 16 modules.
§ When configuring your system using a MicroLogix 1500 controller, only one expansion cable, one expansion power supply, and a total of 8 I/O modules may be used in a maximum of two banks of I/O modules. The expansion power supply cannot be directly connected to the MicroLogix 1500 controller.
♣4000 mA @ 5V (0…55 °C)
4000 mA @ 5V (55…60 °C)
2000 mA @ 24V (0…55 °C)
1700 mA @ 24V (55…60 °C)
⌘4000 mA @ 5V (0…55 °C)
1700 mA @ 5V (55…60 °C)
✦2000 mA @ 24V (0…55 °C)
2000 mA @ 24V (55…60 °C)

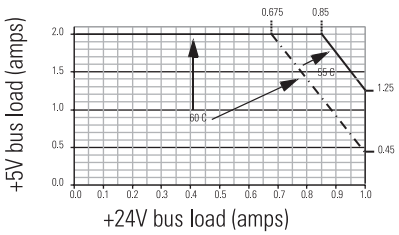
1769 Power Requirements and Transformer Sizing

1769-PA2 output derating

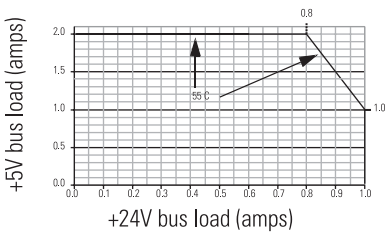
user +24V current draw at 0A



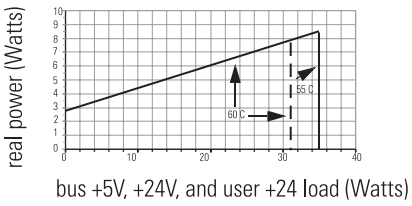
user +24V current draw at 0.2A



user +24V current draw at 0.25A

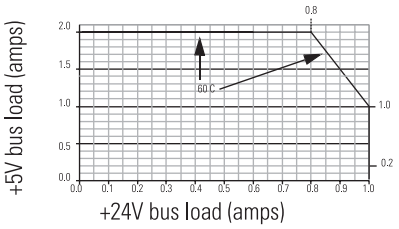


1769-PA2 power dissipation

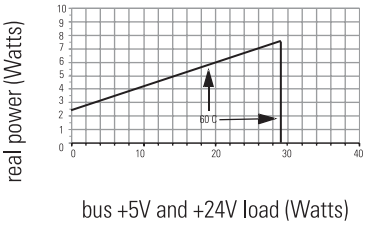


1769-PB2 output derating

total output: 29W @ 60°C or below

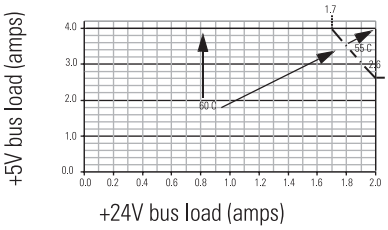


1769-PB2 power dissipation



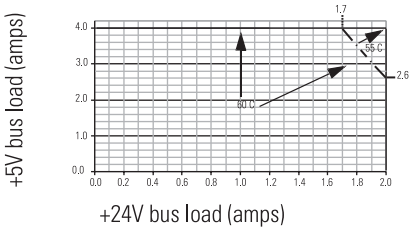
1769-PA4 output derating

total output: 68W @ 55°C or below
61W @ 60°C or below

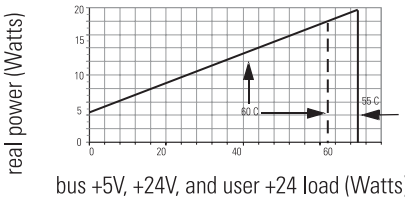


1769-PB4 output derating

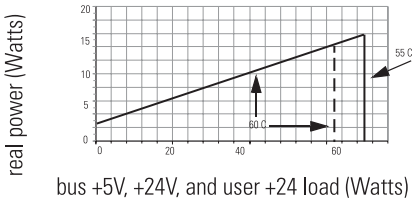
total output: 68W @ 55°C or below
61W @ 60°C or below



1769-PA4 power dissipation



1769-PB4 power dissipation



Step 6 - Select:

- *Panel mount or DIN rail mount*
- *Appropriate number of panels or DIN rails based on the number of modules and the physical location*
- *Expansion cables*
- *One end cap per controller system*

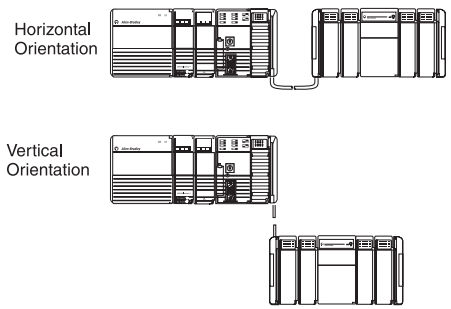
Mount the CompactLogix System

You can panel mount or DIN-rail mount a CompactLogix system. The CompactLogix system must be mounted so that the modules are horizontal to each other.

If you decide to use a DIN rail, use steel, 35 x 7.55mm DIN rails (A-B part number 199-DR1; 46277-3; EN 50022). The DIN rails for all CompactLogix system components must be mounted on a common, conductive surface to be sure of proper electromagnetic interference (EMI) performance.

Select Expansion Cables

How you orient I/O banks determines which expansion cables you need to connect the I/O banks.



If You Add a:	And Connect the Chassis:	Use This Cable:
Second bank	right to left	1769-CRLx
	right to right	1769-CRRx
Third bank	right to left	1769-CRLx
	right to right	1769CRRx
	left to left	1769-CLLx

Where x = 1 for 1 ft (305 mm) or 3 for 3.28 ft (1 m).

Select End Caps

The final I/O bank in the CompactLogix system needs an end cap on the end without the expansion cable.

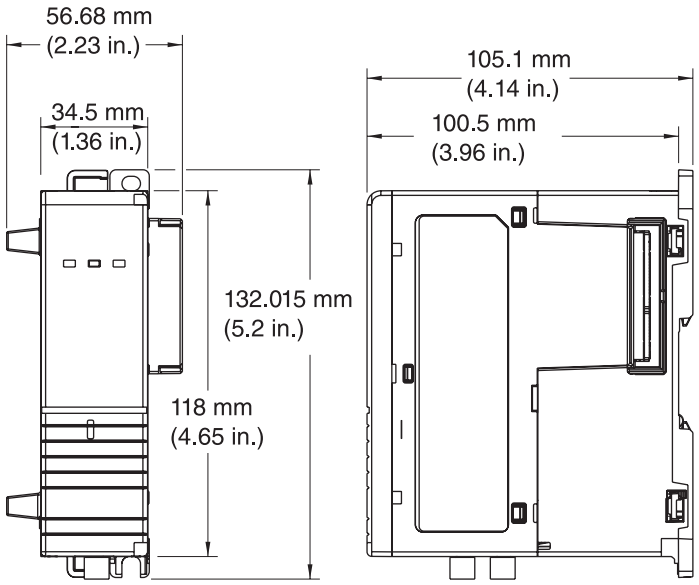
For a	Order
Right end cap	1769-ECR
Left end cap	1769-ECL

Ground the System

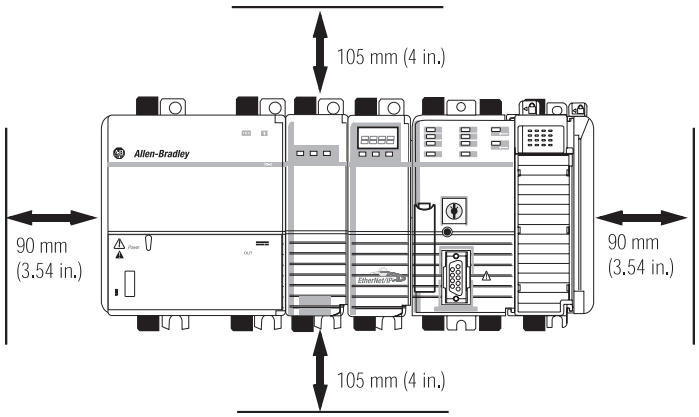
Ground a CompactLogix system through the:

- non-coated, steel DIN rail.
- panel-mount screw hole containing the ground strap.

Single 1768 Slot Dimensions



Minimum Spacing Requirements



Step 7 - Select:

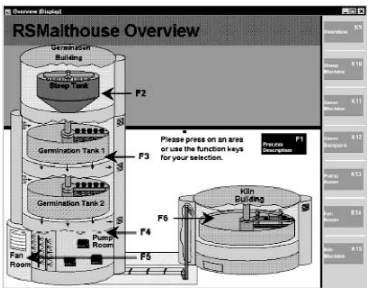
- *RSLinx Enterprise software*
- *Operator interface terminal or computer*

Select ViewAnyWare Products

ViewAnyWare products, together with Logix for control and NetLinx architecture for communication, make up Rockwell Automation's Integrated Architecture strategy. The ViewAnyWare strategy combines Rockwell Automation's expertise in Allen-Bradley electronic operator interface and industrialized PC hardware with Rockwell Software's supervisory control software. Current ViewAnyWare products include:

- RSView Enterprise Series software
- PanelView Plus operator interface
- VersaView industrial computers and monitors
- VersaView CE industrial computer

RSView Enterprise Series Software



RSView Enterprise Series software from Rockwell Software is a line of HMI software products designed with a common look, feel, and navigation to help speed HMI application development and training time. With RSView Enterprise Series 3.0, you can reference existing Logix data tags. Any changes made to these referenced tags are automatically inherited by RSView software. RSView Enterprise Series software includes:

- RSView Studio lets you create applications in a single design environment. It configures RSView Supervisory Edition, RSView Machine Edition, VersaView CE, and PanelView Plus applications. It supports editing and reusing projects for improved portability between embedded machine and supervisory HMI systems.
- RSView Machine Edition (ME) is a machine-level HMI product that supports both open and dedicated operator interface solutions. It provides a consistent operator interface across multiple platforms (including Microsoft Windows CE, Windows 2000/XP, and PanelView Plus solutions), and is ideal for monitoring and controlling individual machines or small processes.
- RSView Supervisory Edition (SE) is an HMI software for supervisory-level monitoring and control applications. It has a distributed and scalable architecture that supports distributed-server/multi-user applications. This highly scalable architecture can be applied to a stand-alone, one-server/one-user application or to multiple users interfacing with multiple servers.

RSView Enterprise Series Products	Cat. No.	Description
RSView Studio	9701-VWSTENE	RSView Studio for RSView Enterprise Series
	9701-VWSTMENE	RSView Studio for Machine Edition
RSView Machine Edition	9701-VWMR015AENE	RSView ME Station runtime for Windows 2000, 15 displays
	9701-VWMR030AENE	RSView ME Station runtime for Windows 2000, 30 displays
	9701-VWMR075AENE	RSView ME Station runtime for Windows 2000, 75 displays
RSView Supervisory Edition	9701-VWSCWAENE	RSView SE client
	9701-VWSCRAENE	RSView SE view client
	9701-VWSS025AENE	RSView SE server 25 displays
	9701-VWSS100AENE	RSView SE server 100 displays
	9701-VWSS250AENE	RSView SE server 250 displays
	9701-VWSS000AENE	RSView SE server unlimited display
	9701-VWB025AENE	RSView SE station 25 displays
	9701-VWB100AENE	RSView SE station 100 displays
	9701-VWB250AENE	RSView SE station 250 displays
	9701-VWSB000AENE	RSView SE station unlimited display

PanelView Plus Terminal

The PanelView Plus terminal is ideal for applications with a need to monitor, control, and display information graphically, allowing operators to quickly understand the status of their application. PanelView Plus terminals come with RSView Studio software and have embedded RSView Machine Edition software functionality. It combines the best features from the popular Allen-Bradley PanelView Standard and PanelView "e" operator interface products and adds new functionality including:

- Multi-vendor communications
- Trending
- Expressions
- Data logging
- Animation
- RSView Studio software direct browsing of RSLogix 5000 addresses

VersaView Industrial Computers and Monitors

VersaView products are a family of industrial computer and monitor solutions, comprised of integrated display computers, workstations, non-display computers, and flat panel monitors. VersaView products offer effortless management of changing technology, a rugged but cost-effective design, and easier product configuration. All VersaView products provide the latest industrial solution available, optimized for visualization, control, information processing, and maintenance application.

VersaView CE Industrial Computers

VersaView CE products offer open Windows CE terminals in Windows desktop environments - bringing together features of operator interfaces and industrial computers. It is a high performance computer with a compact flash drive and integrated RSView Machine Edition runtime (no activation required). There's no hard disk, no fan, and no moving parts, which means maximum reliability on the plant floor. Easy to set up and maintain, VersaView CE means an open system that's rugged and economical, offering high functionality in an easy to use package.

Step 8 - Select:

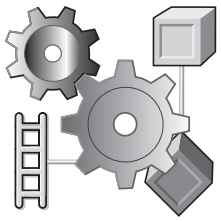
- *The appropriate package of RSLogix 5000 Enterprise Series software and any options*
- *Other software packages for your application*
- *An appropriate operator interface*

Software and Operator Interface

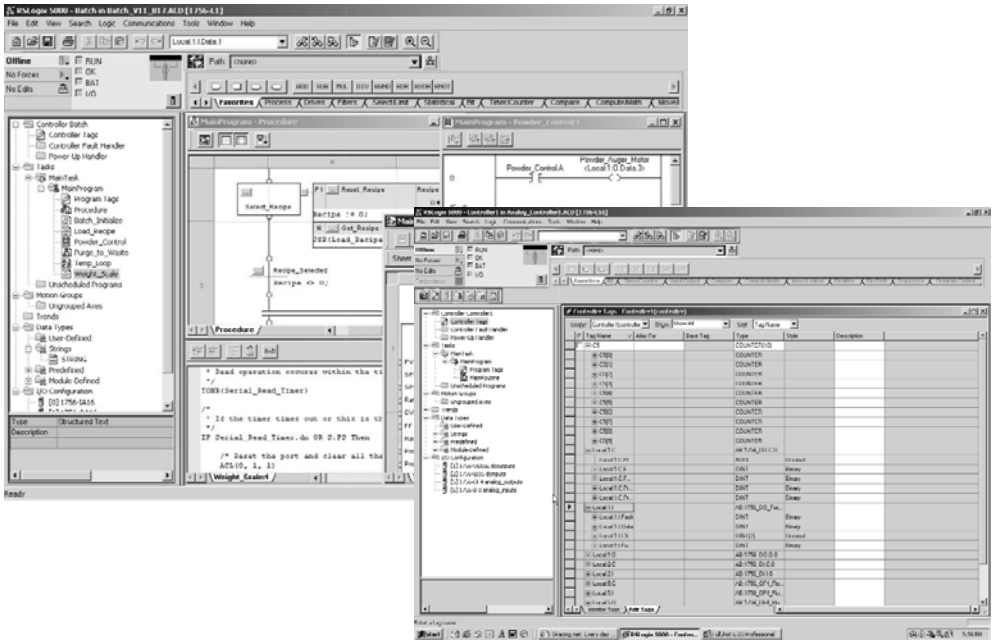
Your selection of modules and network configuration determines what software packages you need to configure and program your system.

If You Have	You Need	Order This
1768 CompactLogix controller	RSLogix 5000 Enterprise Series software CompactFlash software	9324 series (RSLogix 5000 Enterprise Series software) Use Standard Edition or higher to support motion If no motion, you can use the Mini Edition or Lite Edition
SERCOS motion interface		SERCOS Motion interface
EtherNet/IP interface (set the IP address)	RSLinx software (RSLinx Lite and BOOTP server come with RSLogix 5000 Enterprise Series software) or RSNetWorx for EtherNet/IP software (comes with the standard/RSNetWorx option of RSLogix 5000 Enterprise Series software) and BOOTP/DHCP server utility to set IP addresses	9324 series (RSLogix 5000 Enterprise Series software) or 9324-RLD300NXENE (RSLogix 5000 Enterprise Series software plus RSNetWorx option) or 9357-ENETL3 (RSNetWorx for EtherNet/IP)
DeviceNet interface	RSNetWorx for DeviceNet software (comes with the standard/RSNetWorx option of RSLogix 5000 Enterprise Series software)	9324-RLD300NXENE (RSLogix 5000 Enterprise Series software plus RSNetWorx option) or 9357-DNETL3 (RSNetWorx for DeviceNet)
Communication card in a workstation	RSLinx software (RSLinx Lite comes with RSLogix 5000 Enterprise Series software)	9324 series (RSLogix 5000 Enterprise Series software)
Logix-based system you want to emulate	RSLogix Emulate 5000	9310-WED200ENE
Operator interface	RSView Enterprise series software	ViewAnyWare products

Programming Software



RSLogix 5000 Enterprise Series software is designed to work with Rockwell Automation's Logix platforms. RSLogix 5000 Enterprise Series software is an IEC 61131-3 compliant software package that offers relay ladder, structured text, function block diagram, and sequential function chart editors for you to develop application programs. RSLogix 5000 Enterprise Series software also includes axis configuration and programming support for motion control. With RSLogix 5000 Enterprise Series software, you need only one software package for sequential, process, drive, and motion control programming.



RSLogix 5000 Enterprise Series Software Requirements

Description	Value
Personal computer	Pentium II 450 MHz min Pentium III 733 MHz (or better) recommended
Software requirements	Supported operating systems: • Microsoft Windows XP Professional version 2002 (with Service Pack 1 or 2) or XP Home version 2002 • Microsoft Windows 2000 Professional with Service Pack 1, 2, or 3 • Microsoft Windows Server 2003
RAM	128 MB of RAM min 256 MB of RAM recommended
Hard disk space	100 MB of free hard disk space (or more based on application requirements)
Video requirements	256-color VGA graphics adapter 800 x 600 min resolution (True Color 1024 x 768 recommended)

Select the RSLogix 5000 Enterprise Series Software Package

Available Features	Service Edition 9324-RLD000xxE ♠	Mini Edition 9324-RLD200xxE	Lite Edition 9324-RLD250xxE ✦	Standard Edition 9324-RLD300xxE	Standard/ NetWorx Edition 9324-RLD300NXxxE ♣	Full Edition 9324-RLD600xxE ‡	Professional Edition 9324-RLD700NXxxE ♣
Logix5000 controllers supported	all♠	CompactLogix FlexLogix	CompactLogix FlexLogix	all	all	all‡	all
Relay ladder diagram editor§	view only	fully supported	fully supported	fully supported	fully supported	fully supported	fully supported
Function block diagram editor 9324-RLDFBDENE§	view only	upload/download only editor available separately	fully supported	upload/download only editor available separately	upload/download only editor available separately	fully supported	fully supported
Sequential function chart editor 9324-RLDSFCE§	view only	upload/download only editor available separately	fully supported	upload/download only editor available separately	upload/download only editor available separately	fully supported	fully supported
Structured text editor 9324-RLDSTXE§	view only	upload/download only editor available separately	fully supported	upload/download only editor available separately	upload/download only editor available separately	fully supported	fully supported
PhaseManager 9324-RLDPME❖	view only	available separately	available separately	available separately	available separately	included	included
Highly-integrated motion	view only	upload/download only	upload/download only	fully supported	fully supported	fully supported	fully supported
Graphical trending	fully supported	fully supported❖	fully supported❖	fully supported	fully supported	fully supported	fully supported
DriveExecutive Lite 9303-4DTE01ENE	available separately	available separately	available separately	included	included	included	included
PIDE function block autotune 9323-ATUNEENE	available separately	available separately	available separately	available separately	available separately	available separately	included
RSLogix Architect 9326-LGXARCHENE❖	available separately	available separately	available separately	available separately	available separately	available separately	included
RSLogix Emulate 5000 and RSTestStand Lite 9310-WED200ENE	available separately	na	na	available separately	available separately	available separately	included
Logix CPU security tool	included	included	included	included	included	included	included
Routine source protection tool	included	included	included	included	included	included	included
RSMACC authenticate (security server) client	included	included	included	included	included	included	included
Standalone security server explorer	included	included	included	included	included	included	included
RSLinx	Lite included	Lite included	Lite included	Lite included	Lite included	Lite included	Professional included♣
RSNetWorx for ControlNet RSNetWorx for DeviceNet RSNetWorx for EtherNet/IP	available separately	available separately	available separately	available separately	included	available separately	included♣
FBD ActiveX faceplates	included	included	included	included	included	included	included
Tag data upload/download tool	included	included	included	included	included	included	included
RSLogix 5000 project compare tool	included	included	included	included	included	included	included
Tag custom data monitor tool	included	included	included	included	included	included	included
RSView demo (50 tags/2 hours)	available separately	available separately	available separately	available separately	available separately	available separately	included
Upgrades	to Standard: 9324-RLD0U3xxE to Full: 9324-RLD0U6xxE to Professional: 9324-RLD0U7xxE	to Standard: 9324-RLD2U3xxE to Professional: 9324-RLD2U7xxE	to Full: 9324-RLD25U6xxE to Professional: 9324-RLD25U7xxE	to Professional: 9324-RLD3U7xxE to Full: multi-language pack⌘	na	to Professional: 9324-RLD6U7xxE	na

Replace "xx" in the catalog number with the appropriate language designation: EN=English, FR=French, DE=German, IT=Italian, PT=Portuguese, and ES=Spanish.

♠Service Edition supports controllers running firmware revision 12 and later.

‡Full Edition supports controllers running firmware revision 10 and later.

§A multiple language editor package is available as 9324-RLDMLPE. It contains the function block, sequential function chart, and structured text editors at a reduced price.

♣To run RSLinx Professional software on a PC, the RSLogix 5000 Professional activation key must be installed on the PC's hard drive. RSLinx software will start in Lite mode if the RSLogix Professional activation key is installed on a different drive (that is, floppy drive, or network drive).

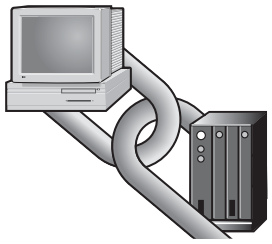
RSNetWorx for ControlNet software is available as 9357-CNETL3. RSNetWorx for DeviceNet software is available as 9357-DNETL3. RSNetWorx for EtherNet/IP software is available as 9357-ENETL3. They are available together as 9357-ANETL3.

⌘The multiple language editor package (9324-RLDMLPE) is not the same as an upgrade, but it extends the programming languages to match those in a Full package.

✦This package includes two activation keys: one for the Mini Edition (9324-RLD200xxE) and the other for the multiple language editor (9324-RLDMLPE).

❖As of RSLogix 5000 programming software version 15.

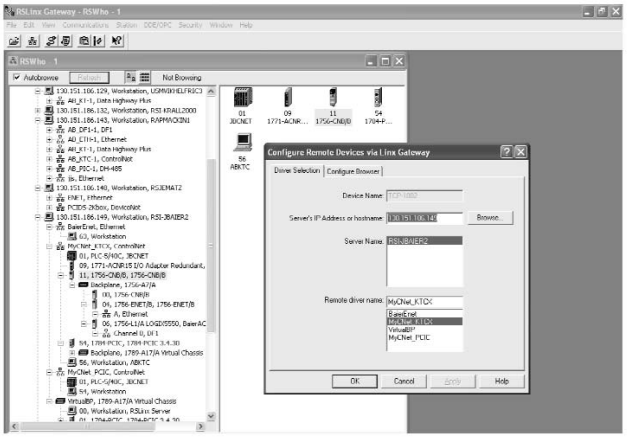
RSLinx Software



RSLinx software is a complete communication server providing plant-floor device connectivity for a wide variety of Rockwell Software applications such as RSLogix 5/500/5000, RSView32, RSView Enterprise Series, and RSSql/RSBizWare software. In addition, several open interfaces are provided for third-party HMI, data collection and analysis packages, and custom client-application software. RSLinx software can support multiple software applications simultaneously, communicating to a variety of devices on many different networks.

RSLinx 2.x software is now joined by RSLinx Enterprise software, a new product within the RSLinx family that provides unparalleled connectivity to Logix processors. RSLinx Enterprise software currently can support working as a data server for widely distributed RSView Supervisory Edition products, RSSql, RSBizWare Historian, and RSBizWare PlantMetrics applications, RSView Machine Edition including PanelView Plus and VersaView hardware platforms, and RSView Supervisory Edition Station.

You can communicate from anywhere to anywhere using RSLinx software.



RSLinx Software Requirements

Description	Description
Personal computer	Pentium100 MHz processor (faster processors will improve performance)
Operating system	Supported operating systems: • Microsoft Windows XP • Microsoft Windows 2000 • Microsoft Windows NT version 4.0 with Service Pack 3 or greater • Microsoft Windows ME • Microsoft Windows 98
RAM	32 MB of RAM min 64 MB or more of RAM recommended
Hard disk space	35 Mbytes of free hard disk space (or more based on application requirements)
Video requirements	16-color VGA graphics display 800 x 600 or greater resolution

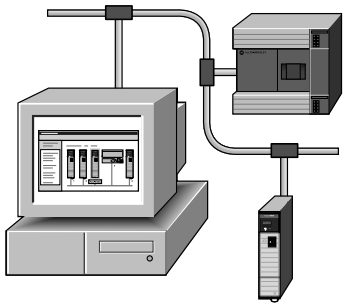
In most cases, RSLinx Lite software comes bundled with controller programming software packages.

Select the RSLinx Software Package

Cat. No.	RSLinx Products
See footnote .	RSLinx Lite
9355-WABSNENE	RSLinx Single Node
9355-WABOEMENE	RSLinx OEM
9355-WABENE	RSLinx Professional
9355-WABGWENE	RSLinx Gateway
9355-WABCENE	RSLinx SDK
9355-RSLETENE	RSLinx Enterprise

This item is only available bundled with other products such as RSLogix software products.

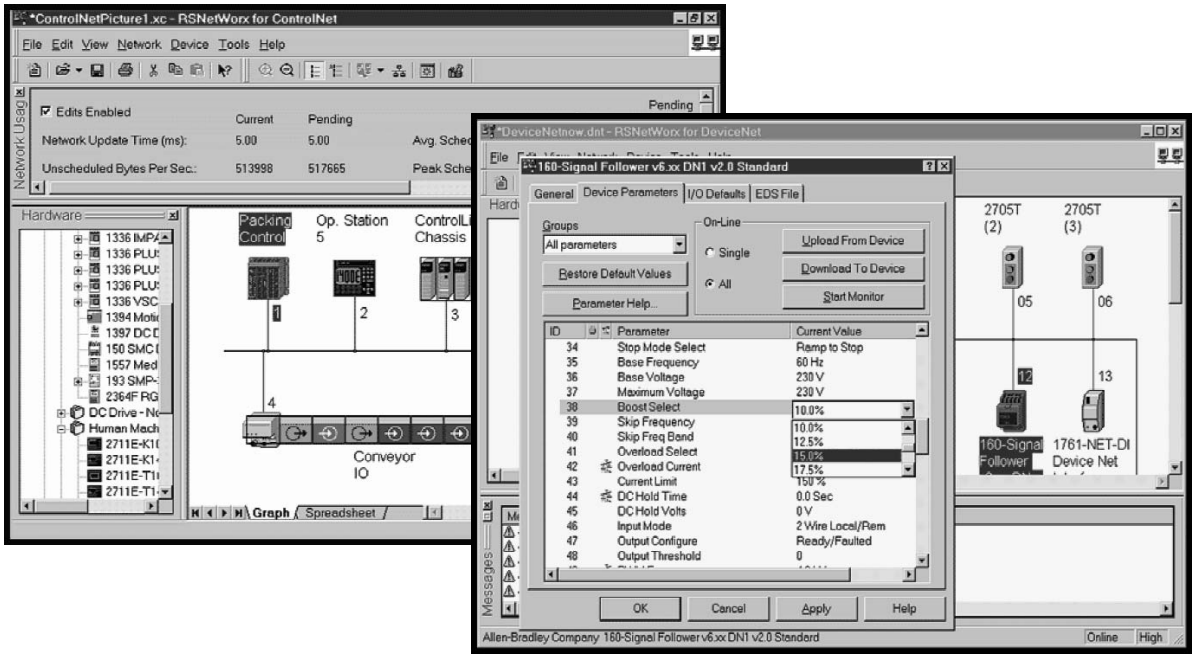
Network Configuration Software



RSNetWorx software is the configuration tool for your control network. With RSNetWorx software you can create a graphical representation of your network configuration and configure the parameters that define your network.

Use RSNetWorx for:

- ControlNet software to schedule network components. The software automatically calculates network bandwidth for the entire network, as well as the bandwidth used by each network component. You must have RSNetWorx software to configure and schedule ControlNet networks.
- DeviceNet software to configure DeviceNet I/O devices and create a scan list. The DeviceNet scanner stores the configuration information and scan list.
- EtherNet/IP software to configure EtherNet/IP devices using IP addresses or host names.



RSNetWorx Software Requirements

Description	EtherNet/IP	ControlNet	DeviceNet
Personal computer	Intel Pentium or Pentium-compatible computer		
Operating system	Supported operating systems: • Microsoft Windows XP • Microsoft Windows 2000 • Microsoft Windows 2000 Terminal Server • Microsoft Windows NT version 4.0 with Service Pack 6 or greater • Microsoft Windows ME • Microsoft Windows 98		
RAM	32 MB of RAM min more memory is required for large networks		
Hard disk space	minimum: 108 MB (includes program files and hardware files) full support: 115...125 MB (includes program files, online help, tutorial, and hardware files)	minimum: 115 MB (includes program files and hardware files) full support: 168...193 MB (includes program files, online help, tutorial, and hardware files)	minimum: 190 MB (includes program files and hardware files) full support: 230...565 MB (includes program files, online help, tutorial, and hardware files)
Video requirements	16-color VGA graphics adapter 640 x 480 resolution minimum 800 x 600 resolution recommended		
Other	RSLinx Lite 2.41 or later to use RSNetWorx online	RSLinx Lite 2.4 or later to use RSNetWorx online	RSLinx Lite 2.4 or later to use RSNetWorx online

In most cases, RSNetWorx software comes bundled with controller programming software packages.

Select the RSNetWorx Software Package

Cat. No.	Description
9357-CNETL3	RSNetWorx Software for ControlNet
9357-DNETL3	RSNetWorx Software for DeviceNet
9357-ENETL3	RSNetWorx Software for Ethernet/IP
9357-ANETL3	RSNetWorx Software for ControlNet, Ethernet/IP and DeviceNet
9357-CNETMD3E	RSNetWorx with MD for ControlNet, Includes DriveExecutive Lite
9357-DNETMD3E	RSNetWorx with MD for DeviceNet
9357-ENETMD3E	RSNetWorx with MD for Ethernet
9357-ANETMD3E	RSNetWorx with MD for ControlNet, DeviceNet, and Ethernet/IP

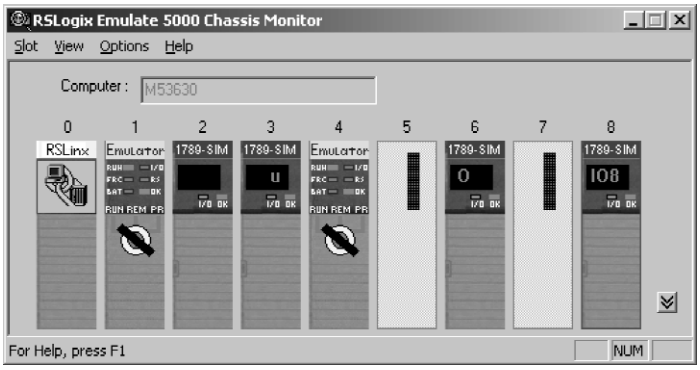
RSLogix Emulate 5000 Software

RSLogix Emulate 5000 software (9310-WED200ENE) is the emulation package for the Logix5000 controllers. RSLogix Emulate 5000 software used in conjunction with RSLogix 5000 software lets you run and debug your application code while at your computer. In addition, RSLogix Emulate 5000 software also lets you test HMI screens, developed in RSView software for example, without the need to connect to a real controller.

You can set tracepoint and breakpoint instructions (ladder diagram only) in your application code, use traces, and also vary the execution speed of the emulator. RSLogix Emulate 5000 software supports all the programming languages (ladder diagram, function block diagram, structured text, and sequential function chart). RSLogix Emulate 5000 software does not allow for control of real I/O.

Use RSLogix Emulate software for:

- Troubleshooting — Stop the process whenever a selected rung goes true, effectively freezing the process at the instant that any error occurs.
- Ladder Logic Scanning Options — Scan your ladder logic continuously, one program scan at a time, rung-by-rung, or select a specific block of rungs to emulate. Selecting a block of rungs lets you isolate a particular section of the program for testing purposes. You can also set trace points to trace application program tags and set break points to halt program execution at predetermined locations.



RSLogix Emulate 5000 Requirements

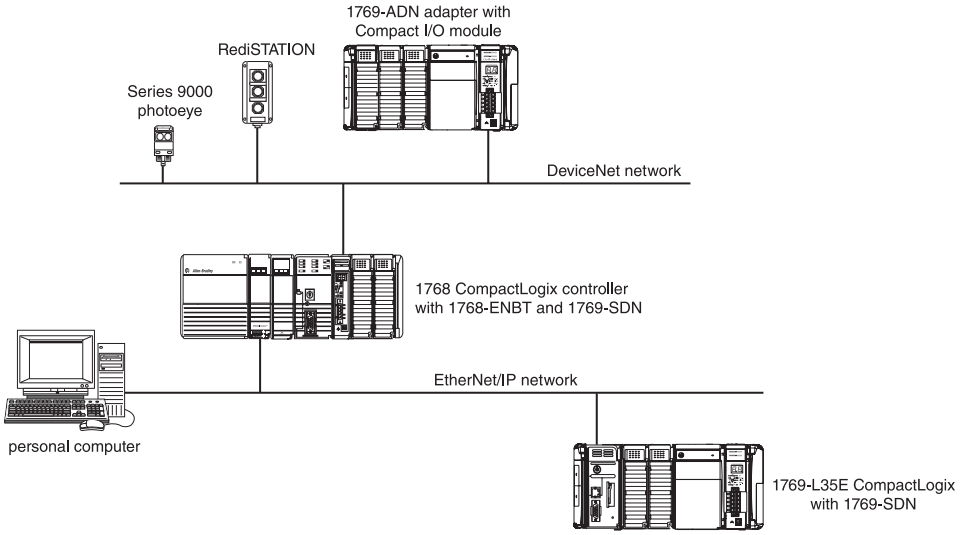
Description	Description
Personal computer	IBM-compatible Intel Pentium II 300 MHz or Celeron 300A (Pentium III 600 MHz recommended)
Operating system	Supported operating systems: Supported operating systems: • Microsoft Windows XP with Service Pack 1or greater • Microsoft Windows 2000 with Service Pack 2 or greater • Microsoft Windows NT version 4.0 with Service Pack 6A or greater
RAM	128 MB of RAM min
Hard disk space	50 MB of free hard disk space
Video requirements	16-color VGA graphics display 800 x 600 or greater resolution

RSLogix Emulate 5000 software includes RSTestStand Lite software. RSTestStand Lite software lets you create virtual operator consoles that can help test your application code. RSTestStand Lite software can be upgraded to the standard version by ordering catalog number 9310-TSTNDENE.

RSLogix Emulate 5000 and RSTestStand Lite software are included with RSLogix 5000 Professional software.

Summary

Use a spreadsheet to record the amount and type of devices your CompactLogix system needs. For example, this sample system:



could result in these spreadsheets:

Controller 1 - 1768-L43				
Device	**Number of Points Needed**	**Cat. No.**	**I/O Points per Module**	**Number of Modules**
1768 Backplane				
Controller	na	1768-L43	na	1
EtherNet/IP communication module	na	1768-ENBT	na	1
SERCOS Motion Module	na	1768-M04SE	na	1
1768 backplane subtotal				1 1768-L43 controller 1 1768-ENBT scanner 1 1768-M04SE module

Controller 1 - 1768-L43				
Device	**Number of Points Needed**	**Cat. No.**	**I/O Points per Module**	**Number of Modules**
1769 Backplane				
120V ac digital inputs	12	1769-IA816	16	1
4...20mA analog inputs	3	1769-IF4XOF2	4	1
4...20mA analog outputs	2	1769-IF4XOF2	2	1 (part of same module from analog input requirements)
DeviceNet scanner	na	1769-SDN	na	1
DeviceNet adapter	na	1769-ADN	na	1
Remote 24V dc digital outputs	30	1769-OB16	16	2
Remote contact outputs	3	1769-OW6	6	1
Controller subtotal				2 local 1769 I/O modules 1 1769-SDN scanner 1 remote 1769-ADN adapter 3 remote 1769 I/O modules

System Components

As you select devices for your 1768 CompactLogix system, keep in mind:

✓	Step		Select
	1	**Select I/O devices**	• I/O modules • Wiring system (if you want to use a wiring system instead of the terminal block that comes with module) • PanelConnect modules and cables if connecting input modules to sensors • Expansion cables if planning multiple banks of I/O modules
	2	**Select motion control and drives requirements**	• The size of the motion application (use the Motion Book) • How you want to interface the controller and drives • The SERCOS interface • Associated cables • Drives, motors, and accessories (use the Motion Book)
	3	**Select communication modules**	• Networks • Communication interfaces • Associated cables and network equipment Some networks have companion documents to help you select the appropriate equipment. See your Rockwell Automation representative for information.
	4	**Select controllers**	• A controller with sufficient memory • A CompactFlash card
	5	**Select power supplies**	• 1768 power supply • For more than eight 1769 modules, additional 1769 power supplies as needed
	6	**Mount the system**	• Panel mount or DIN-rail mount • Appropriate number of panels or DIN number of modules and the physical • One end cap per controller system
	7	**Select ViewAnyWare products**	• The appropriate package of RSView software • PanelView Plus terminals • VersaView computers
	8	**Select software**	• The appropriate package of RSLogix 5000 Enterprise Series software and any options • Other software packages for your application

Calculate 1769 Power Use

If you have additional banks of 1769 I/O modules, each bank needs its own power supply.

Cat. No.	Number of Modules	Module Current Requirements (mA)		Calculated Current (mA) = (number of modules) x (module current requirements)	
		5V dc	24V dc	5V dc	24V dc
1769-ARM		60	0		
1769-ASCII		420	0		
1769-HSC		425	0		
1769-IA8I		90	0		
1769-IA16		115	0		
1769-IF4		120	60		
1769-IF4I		145	95		
1769-IF4XOF2		120	160		
1769-IF8		120	70		
1769-IM12		100	0		
1769-IQ16		115	0		
1769-IQ16F		110	0		
1769-IQ32		170	0		
1769-IQ32T		170‡	0		
1769-IQ6XOW4		105	50		
1769-IR6		100	45		
1769-IT6		100	40		
1769-OA8		145	0		
1769-OA16		225	0		
1769-OB8		145	0		
1769-OB16		200	0		
1769-OB16P		160	0		
1769-OB32		300	0		
1769-OF2		120	120		
1769-OF4CI		145	140		
1769-OF4VI		145	75		
1769-OF8C		145	160		
1769-OF8V		145	125		
1769-OV16		200	0		
1769-OV32T		200‡	0		
1769-OW8		125	100		
1769-OW8I		125	100		
1769-OW16		205	180		
1769-ADN		500	0		
1769-SDN		440	0		
1769-ECL		5	0		
1769-ECR		5	0		
Total Current Required:❄					

One 1769-ECL or 1769-ECR end cap/terminator is required in the system. The end cap/terminator used is dependent on your configuration.
❄The total current required must not exceed the power supply capacity listed below.

1769 Power Supply Capacity

Specification	1769-PA2	1769-PB2	1769-PA4	1769-PB4
Output current capacity (0...55° C)	2A @ 5V dc 0.8A @ 24V dc	2A @ 5V dc 0.8A @ 24V dc	4A @ 5V dc 2A @ 24V dc	4A @ 5V dc 2A @ 24V dc
24V dc user output capacity (0...55° C)	250mA	na	na	na

Record Module Placement

Use the following charts to record module placement. These charts have positions for the maximum number of modules in an I/O bank. The controller cannot necessarily support modules in all positions. Follow these guidelines as you place 1768 modules:

- The 1768 power supply must be the leftmost module in the 1768 backplane.
- The controller must be the rightmost module in the 1768 backplane.
- As many as two additional 1768 modules can be between the controller and power supply.

Follow these guidelines as you place 1769 modules to the right of the 1768 backplane:

- As many as eight 1769 modules can be attached to the right of the 1768 system.
- The 1769 I/O connected directly to the 1768 backplane does not need a 1769 power supply.
- Additional 1769 modules must be in additional I/O banks.
- Each additional I/O bank must have its own, standard 1769 power supply.

1768 Controller System			
Module	**Placement**	**Backplane Current @ 5 V (mA)**	**Backplane Current @ 24 V (mA)**
1768 Backplane			
1768-PA3 power supply	leftmost	—	—
	—		
	—		
1768-L43 controller	rightmost		
1769 Backplane			
	right		
	right		
	right		
	right		
	right		
	right		
	right		
	right		
1769-ECR right-end cap	right	—	—
Totals		mA	mA

You only need an end cap if this is the last bank in the system.

Bank 1

Module	Placement (left or right of power supply)	Backplane Current @ 5 V (mA)	Backplane Current @ 24 V (mA)
1769-_____ expansion cable	left or right	—	—
1769-_____ end cap	left or right	—	—
	left		
	left		
	left		
	left		
	left		
	left		
	left		
	left		
1769-_____ power supply	—	—	—
	right		
	right		
	right		
	right		
	right		
	right		
	right		
	right		
Totals		mA	mA

You only need an end cap if this is the last bank in the system. Place an end cap on the end opposite of the expansion cable.

Bank 2

Module	Placement (left or right of power supply)	Backplane Current @ 5 V (mA)	Backplane Current @ 24 V (mA)
1769-_____ expansion cable	left or right	—	—
1769-_____ end cap	left or right	—	—
	left		
	left		
	left		
	left		
	left		
	left		
	left		
	left		
1769-_____ power supply	—	—	—
	right		
	right		
	right		
	right		
	right		
	right		
	right		
	right		
Totals		mA	mA

You only need an end cap if this is the last bank in the system. Place an end cap on the end opposite of the expansion cable.

Notes

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